SPEC NO ANZY020040
19 September 2003

GENERAL SPECIFICATION

FOR

ELEVATED POTABLE WATER TANK REPAIR

BUILDING 351

ARNOLD ENGINEERING DEVELOPMENT CENTER

ARNOLD AIR STATION, TN 37389-1332

INDEX

SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY: Provide all materials, labor, and equipment in accordance with the requirements for the Elevated Potable Water Tank Repair, Building 351 at Arnold Air Force Base, Tennessee. Work includes but is not limited to the following:

A. Surface preparation, painting systems, and methods of application for painting water tank interior and exterior in accordance with these specifications and applicable drawings. This specification includes the requirement for cleaning and applying protective coatings to surfaces, which have been previously painted and contain heavy metals that require abatement prior to re-coating. Provide water tower paint of one color and no logo. All painting applications will be with brush and / or roller. Tank down time shall be kept to a minimum. Submit schedule for work for approval.

B. Disinfection of the Elevated Water Tank: Provide all material and labor for the disinfection of the elevated portable water storage tank.

C. Cathodic Protection System for the Water Tank Interior. Provide system by certified Cathodic Protection specialist and engineers. Provide final work when tank has been refilled. Perform Cathodic Protection work without delays in the schedule to restore the water tank to full operating capacity.

D. New steel ladders with safety features to meet AWWA D100, OSHA 29 CFR 1910.27, and ASSE A14.3 codes, including:
   1. Vertical exterior ladder attached to one leg of tank.
   2. Transition ladder from platform to walk deck above.
   3. Dome revolving ladder.
   4. Tank interior ladder.
   5. Riser ladder,
   6. 8-foot lockable ladder barrier.

   All ladders to match existing appearance and placements. Dispose of demolished ladders per Government Representative.

E. Provide fall protection system for all ladders, including transition ladder from platform to walk deck above.

F. Remove areas of ponding water by drilling 3/8” holes in steel plate in locations as needed to drain the water.

G. Lead Abatement. All water shall be contained until testing limits have been determined safe. See Section 02085.

H. Grout and seal base flanges. Demolish existing grout and restore with uniform, high strength, quick cure, high bond, high flexural strength, trowel grade epoxy cementitious materials.

I. Remove all aircraft warning lights and related wiring.

1.2 RECORD (AS-BUILT) DRAWINGS

A. Mark one full-sized copy of AEDC drawings (red-line) to accurately show as-built conditions during the progress of the job. Show all changes, additions, and deviations from the original drawings. If no changes occur, furnish certification to that effect. Submit to the Contracting Officer for approval prior to applying for final payment.

1.3 DEFINITIONS

A. Certain terms used in the contract documents are defined below. Definitions and explanations contained in this section are not complete, but are general for the work to the extent they are not stated more explicitly in another element of the contract documents.
   1. Furnish. The term "furnish" means to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations.
   2. Install. The term "install" describes operations at the project site, including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimensions, finishing, curing, protecting, cleaning, and similar operations.
   3. Provide. The term "provide" means "provide complete in place"; that is, "furnish and install."
   4. Indicated. Where "as indicated" or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise.

1.4 CODES AND STANDARDS

A. AEDC Safety Standard*:

1.	A6 with Supplement	User and Subcontractor Safety (Mandatory Documents/Submittals), 1996.
2.	B1	Work Clearances, 2002.
3.	B2	Safety Locks and Tags, 2002.
4.	E18	Managing Wastes Containing Chemical or Petroleum Products, 1998.

* The Government representative will furnish a copy of this Safety Standard to the contractor upon request.

B. Air Force Federal Acquisition Regulation (AFFARS):
   1. 5352.223-9000 Elimination of Use of Class I Ozone Depleting Substances (ODS), May 1996.

C. American Society of Safety Engineers (ASSE) Standard:
   1. A14.3-92 Safety Requirements for Fixed Ladders.

D. American Water Works Association (AWWA) Standard:
   1. D100-96 Welded Steel Tanks for Water Storage.

E. Code of Federal Regulations (CFR):
   1. 29 CFR 1910.27 Fixed Ladders, 2003.
   2. 29 CFR 1926.1101 Asbestos, 2003.
   3. 40 CFR 261 Identification and Listing of Hazardous Waste, 2002.
   4. 40 CFR 370 EPA Hazardous Chemical Reporting and Community Right to Know Requirement, 2002.

1.5 JOB CONDITIONS

A. Plan and execute this project in a manner to minimize downtime. Furnish new components and devices, complete, with all necessary materials for installation to meet this objective. Schedule all work in advance with the Government representative.

B. This work requires a water outage to remove the water tank from service. Coordinate with the Government representative for exact time of outage.

C. Place all sanitary waste from lunches in local area dumpsters.

1.6 ASBESTOS PRODUCTS

A. Do not use products or materials that contain asbestos on this project except as expressly authorized by the Contracting Officer. If no substitutes for asbestos products are available, and the Contracting Officer approves the use of asbestos products, highlight and detail their exact location on the drawings and identify their location in the field following 29 CFR 1926.1101 guidelines.

1.7 HAZARDOUS WASTE

A. Where hazardous waste (as identified in 40 CFR 261) is generated, follow the procedures in AEDC Safety Standard E18, Chemical and Petroleum Products Waste Management, for storing and turning in hazardous waste.

These procedures include the requirement to complete Forms GC-565 and GC-1337, which will be furnished by the Government representative.

1.8 DISALLOWED PRODUCTS

A. Do not use products or materials that contain lead, chromium, mercury, cadmium, silver, barium, selenium, beryllium, or arsenic on this project except as expressly authorized by the Contracting Officer. If no substitutes for products containing the listed materials are available, and the Contracting Officer approves the use of products containing the listed materials, highlight and detail their exact location on the drawings.

1.9 ELIMINATION OF ODS CHEMICALS

A. The use of Class I ozone depleting substances (ODS) is prohibited. Reference text of AFFARS clause 5352.223-9000 (May 1996).

1.10 SAFETY REQUIREMENTS:

A. Safety will allow the use of the existing ladders, with the use of fall protection, during the construction period. All contractor employees shall be trained and certified for Confined Space admittance before performing work on this project. Submit certificates for approval.

B. All work shall be accomplished in compliance with AEDC Safety Standards A6 with supplement, B1, and B2.

1.11 SECURITY REQUIREMENTS

A. Advise prospective bidders that failure to comply with established security rules and procedures while on the property of Arnold Air Force Base could result in disbarment from the base. Applicable security rules are contained in AEDC COI 31-201, Security-Traffic. The work is not being done in a secure, classified area.

1.12 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA

A. The following procedures shall be followed to meet 40 CFR 370, EPA Hazardous Chemical Reporting and Community Right to Know Requirement.
   1. Procedures:
      a. The contractor shall furnish information on the hazardous materials he brings on AEDC property prior to beginning on-site work. Hazardous materials may include solvents, paints, adhesives, acids, or any other substance which could be included within the definitions in paragraph 2.

b. The information required is:
   1) Company name, point of contact, and phone number.
   2) Brief statement indicating how the hazardous material will be used within the scope of the contract.
   3) List of all hazardous materials to be used (product name, manufacturer's name, and address).
   4) Amount of each material to be stored on site and where it will be stored.
   5) Where the product Material Safety Data Sheets (MSDS) will be maintained.
c. All unused product is the responsibility of the contractor and shall be removed from AEDC property at the completion of the project.
d. The contractor shall coordinate with the Government representative and the Hazardous Waste Operations Group (454-3628) if any hazardous waste is to be generated.

2. Definitions
   a. Hazard communication standard. A chemical right-to-know law under OSHA that requires chemical manufacturers and importers to assess the hazards of chemicals they make or import and to distribute this information to inform workers of the hazards associated with these chemicals. This written information is a Material Safety Data Sheet (MSDS).
   b. Hazard classes. Hazardous materials that have been grouped into classes by the Department of Transportation (DOT). These classes include explosives, flammables, oxidizers and organic peroxides, compress gases, corrosives, and poisons.
   c. Hazardous material. Any substance that may be harmful when used. Specific substances have been designated as hazardous under the Clean Water Act, the Resource and Conservation and Recovery Act, and the hazardous air pollutants under the Clean Air Act.
   d. Hazardous waste. Any waste that may cause or significantly contribute to serious illness or death or that may pose a substantial threat to human health or the environment, if not properly managed. Hazardous wastes may be solids, liquids, semi-solids, or compressed gases.

END OF SECTION

SECTION 01060
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 This section lists regulations, codes, and standards which specify procedural requirements imposed upon the work.

1.2 The contractor shall comply with the following documents to the extent referenced herein.

A. Government documents.

1. AEDC Safety Standards*:

a.	A6	User and Subcontractor Safety, 1996.
b.	A9	Hazard Communication, 1996.
c.	B1	Work Clearances, 2002.
d.	B2	Safety Locks and Tags, 2002.
e.	D8	Portable Power Tools, 1997.
f.	E17	Oil and Hazardous Substances Spill Response, 2002.
g.	E18	Managing Wastes Containing Chemical or Petroleum Products, 1998.
h.	E19	Lead and Heavy Metals Abatement, 1997.
i.	F4	Respiratory Protection, 1998.

* The Government representative will furnish a copy of these Safety Standards to the contractor upon request.

2. Air Force Federal Acquisition Regulation (AFFARS):

a.	5352.223-9000	Elimination of Use of Class I Ozone Depleting Substances (ODS), May 1996.

3. Code of Federal Regulations (CFR):

a.	29 CFR 1910.27	Fixed Ladders, 2003.
b.	29 CFR 1910.134	Respiratory Protection, 2003.
c.	29 CFR 1910.1200	Hazard Communication, 2003.
d.	29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists, 2003.
e.	29 CFR 1926.57	Ventilation, 2003.
f.	29 CFR 1926.62	Construction Industry Standards, 2000.
g.	29 CFR 1926.1101	Asbestos, 2003.
h.	40 CFR 260	Hazardous Waste Management Systems: General, 2002.
i.	40 CFR 261	Identification and Listing of Hazardous Wastes, 2002.
j.	40 CFR 262	Generators of Hazardous Waste, 2002.

k.	40 CFR 370	EPA Hazardous Chemical Reporting and Community Right to Know Requirement, 2002.
l.	49 CFR 172	Department of Transportation (DOT) Regulations for Use of Hazardous Materials Tables and for Communications, 2003.
m.	49 CFR 178	DOT Specifications for Packaging, 2003.

4. Environmental Protection Agency (EPA) Document:

a.	SW-846	Proposed Sampling and Analytical Methodologies for Additions to Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 1984.

5. U. S. Army Corps of Engineers Manual:

a.	EM 385-1-1	Safety and Health Requirements Manual, 1996.

B. Non-Government documents.

1. American National Standards Institute (ANSI) Standards:

a.	Z9.2-01	Fundamentals Governing the Design and Operations of Local Exhaust Systems.
b.	Z88.2-92	Respiratory Protection.

2. American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME B&PVC) Standards:

a.	SEC II-C-98	Welding Rods, Electrodes, and Filler Metals-Non-Interfiled.

3. American Society of Safety Engineers (ASSE) Standard:

a.	A14.3-92	Safety Requirements for Fixed Ladders.

4. American Society for Testing and Materials (ASTM) Standards:

a.	A36-03	Carbon Structural Steel.
b.	A108-99	Steel Bars, Carbon, Cold-Finished, Standard Quality.
c.	A283-03	Low and Intermediate Tensile Strength Carbon Steel Plates.
d.	A307-02	Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
e.	B117-02	Operating Salt Spray (Fog) Apparatus.
f.	C150-02	Portland Cement.
g.	C404-97	Aggregates for Masonry Grout.
h.	C882-99	Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
i.	D16-00	Standard Terminology for Paint, Related Coatings, Materials, and applications.
j.	D638-02	Tensile Properties of Plastics.

k.	D695-02	Compressive Properties of Rigid Plastics.
l.	D790-03	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
m.	D1172-01	Standard Guide for pH of Aqueous Solutions of Soaps and Detergents.
n.	D4060-01	Abrasion Resistance of Organic Coatings by the Taber Abraser
o.	D4541-02	Pull-Off Strengths of Coatings Using Portable Adhesion Testers
p.	E994-95	Calibration and Testing Laboratory Accreditation Systems.

5. American Water Works Association (AWWA) Standards:

a.	C652-02	Disinfection of Water-Storage Facilities.
b.	D100-96	Welded Steel Tanks for Water Storage.
c.	D102-97	Coating Steel Water Storage Tanks.
d.	D104-01	Automatically Controlled, Impressed-Current Cathodic Protection for the Interior of Steel Water Tanks.

6. American Welding Society (AWS), Inc. Standards:

a.	A2.4-98	Symbols for Welding, Brazing and Nondestructive Examination.
b.	D1.1-02	Structural Welding Code-Steel.
c.	D14.1-97	Welding of Industrial and Mill Cranes and Other Material Handling Equipment.
d.	Z49.1-99	Safety in Welding, Cutting, and Allied Processes.

7. National Association of Corrosion Engineers (NACE) Standard:

a.	No. 2-99	Joint Surface Preparation Standard Near-White Metal Blast Cleaning Item No. 21066.
b.	No. 5-02	Surface Preparation of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating.

8. National Sanitation Foundation (NSF) Standard:

a.	61-02	Drinking Water System Components-Health Effects.

9. Steel Structures Painting Council (SSPC) Standards:

a.	CHAPTER 2.5-93	Water Blast Cleaning.
b.	CHAPTER 5.1-93	Paint Application.
c.	CHAPTER 6.0-93	Inspection.
d.	PA 2-96	Measurement of Dry Coating Paint Thickness with Magnetic Gages.
e.	SP 1-82	Solvent Cleaning.

f. SP 2-82 Hand Tool Cleaning.
g. SP 3-82 Power Tool Cleaning.
h. SP 6-00 Commercial Blast Cleaning.
i. SP 10-00 Near-White Metal Blast Cleaning.
j. SP 11-87 Power Tool Cleaning to Bare Metal.
k. Guide 6-97 Guide for Containing Debris Generated During Paint Removal Operations.

10. Underwriters Laboratories, Inc. (UL):
    a. 586-00 High-Efficiency, Particulate, Air Filter Units

C. Drawings:
1. Painting Requirements Contract ANZY020040
    a. Drawing No TYT10331
       4 Sheets
    b. Project Item Reference Drawings:
        1. Building No. 351, Elevated Potable Water Tank, Plans, Elevations, and Details

END OF SECTION

SECTION 01340
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS. This section specifies procedural requirements for non-administrative submittals, including shop drawings, product data, samples, and other miscellaneous work-related submittals. These submittals are required to amplify, expand, and coordinate other information contained in the contract. Non-work-related submittals are addressed elsewhere in the contract rather than in the specification and may include items such as: contract progress schedule, permits, payment applications, performance and payment bonds, insurance certificates, and progress reports.

A. Shop drawings. These are technical drawings and data specially prepared for this project including fabrication and installation drawings, setting and seaming diagrams, and coordination drawings (for use on-site).

B. Product data. This data includes standard printed information on manufactured products that has not been specially prepared for this project, including manufacturers' product specifications and installation instructions, standard color charts, catalog cuts, standard wiring diagrams, and standard product operating and maintenance manuals.

C. Samples. These are physical examples of work, including, swatches showing color, texture and pattern, color-range sets, and units of work to be used for independent inspection and testing.

D. Miscellaneous submittals. These are work-related, non-administrative submittals that do not fit in the three previous categories, including the following:
   1. Maintenance agreements.
   2. Survey data and reports.
   3. Project photographs.
   4. Record drawings (as-built drawings).
   5. Field measurement data.
   6. Operating and maintenance manuals.
   7. Keys and other security protection devices.
   8. Maintenance tools and spare parts.
   9. Overrun or maintenance stock.
   10. Qualification certificates.

1.2 SUBMITTAL PROCEDURES

A. Coordination. Coordinate the preparation and processing of submittals with the performance of the work. Coordinate each submittal with other submittals and related activities, such as testing, purchasing, fabrication, and delivery, that require sequential activity.

B. Listing. At the end of this section is a summarized listing of the submittals required for the work. The listing is included for the convenience of users of the contract documents.

C. Transmittal timing. Prepare and transmit each submittal to the Contracting Officer sufficiently in advance of the scheduled performance of related work and other applicable activities. Transmit different kinds of submittals for the same unit of work so that processing will not be delayed by the Government's need to review submittals concurrently for coordination.

D. Review time. Allow sufficient time so that contract performance will not be delayed as a result of the time required to properly process submittals, including time for re-submittals, if necessary. Allow 10 working days for initial Government processing of each submittal. No extension of time will be authorized because of the contractor's failure to transmit submittals to the Government sufficiently in advance of the work.

E. "Approval" submittals. Submittals requiring approval by the Contracting Officer are so designated in the applicable sections and the submittal list at the end of this section. When brand names or equal are specified, any "equal" submitted will require approval. Any submittal requesting a deviation will require approval. Do not install any equipment or material requiring approval submittals until approvals are received from the Contracting Officer. The Government will status receipt or approval of all submittal requirements in the last two columns.

F. "Information only" submittals. Submittals not requiring the Contracting Officer's approval are considered to be "information only" submittals.

1.3 SPECIFIC SUBMITTAL REQUIREMENTS. Submittal requirements for individual units of work are specified in the applicable specification section. Except as otherwise indicated in the individual sections, comply with the following requirements for each type of submittal.

A. Shop drawings. Information required on shop drawings includes dimensions, identification of specific products and materials which are included in the work, compliance with specified standards, and notations of coordination requirements with other work. Provide special notations of dimensions that have been established by field measurements. Highlight, encircle, or otherwise

indicate deviations from the contract documents on the shop drawings. Furnish one reproducible and four copies.

B. Product data. General information required specifically as product data includes manufacturers' standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies, the application of their labels and seals (if any), special notation of dimensions which have been verified by way of field measurement, and special coordination requirements for interfacing the material, product, or system with other work. Furnish four copies.

C. Samples. Submit samples for the Contracting Officer's visual review of general kind, color, pattern, and texture for a final check of the coordination of these characteristics with other related elements of the work and for quality control comparison of these characteristics between the final sample submittal and the actual work as it is delivered and installed.

D. Miscellaneous submittals. These submittals include the following:
   1. Inspection and test reports. Furnish three copies of such reports.
   2. Record drawings. See Section 01010 for requirements.
   3. Operating and maintenance data. Furnish three bound copies of operating data and maintenance manuals.
   4. Materials and tools. Refer to individual sections of the specification for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.
   5. Certifications, reports, instructions, and lists. Furnish three copies of such submittals.

1.4 REQUIRED SUBMITTALS

No.	Section Reference	Submittal Description	App	Info
1	01010 para 1.1.A	Painting Work Schedule	X	
2	01010 para 1.2A	Record Drawings		X
3	01010 para 1.10A.2	Confined Space Training and Certification	X	
4	02050 para 1.3A	Methods and Operations of Demolition	X	
5	02085 para 1.4A	Employee Certification		X
6	02085 para 1.4B	Training and Medical Certification		X
7	02085 para 1.4C	Notice of Violation	X	
8	02085 para 1.4D	Environmental, Health, and Safety Plan	X	
9	02085 para 1.4E	Training and Hazard Communications Certification		X
10	02085 para 1.4F	Product List	X	
11	02085 para 1.4G	Lead Abatement Plan	X	
12	02085 para 1.4H	Air and Substrate Sampling Reports		X

TABLE I. Required submittal list - Continued

No.	Section Reference	Submittal Description	App	Info
13	02085 para 1.4I	Testing Laboratory Certifications		X
14	02085 para 1.4J	Air Monitoring Results		X
15	02085 para 1.4K	Equipment List		X
16	02085 para 1.4L	Rental Equipment List	X	
17	02085 para 1.4M	Shower Water Test Results		X
18	02516 para 1.3A	Disinfection Plan	X	
19	03930 para 1.3A	Product Data	X	
20	03930 para 1.3B	Manufacturer's Mixing Instructions	X	
21	03930 para 1.3C	Manufacturer's Product Certification	X	
22	05050 para 1.4A	Welders Certification and Welding Procedures	X	
23	05500 para 1.4A	Shop Drawings	X	
24	05500 para 1.4B	Welding Connections and Symbols	X	
25	05511 para 1.3A	Product Data	X	
26	05511 para 1.3B	Shop Drawings	X	
27	09900 para 1.2A	Product Data for Paint		X
28	09900 para 1.2B	Manufacturers' Safety Data Sheets		X
29	09900 para 1.2C	Paint Manufacturers' Certifications		X
30	09900 para 1.2D	Safety Meeting Minutes and Attendees		X
31	09900 para 1.2E	Detailed Testing Plan	X	
32	09900 para 1.2F	Test Results	X	
33	09900 para 1.2G	Contractor-Furnished Paint Inspector's Qualifications		X
34	09900 para 1.2H	Rigging Plan	X	
35	09900 para 1.2I	Manufacturer's Product and Safety Data Sheets for the Operation of Power Tools		X
36	09900 para 1.2J	Paint Color Samples		X
37	09900 para 1.2K	Confined Space Training Certification	X	
38	09900 para 1.2L	Paint Work Schedule	X	
39	09960 para 1.5A	Product Data	X	
40	16641 para 1.5A	Document Requirements	X	
41	16641 para 1.5B	Corrosion Engineer Qualifications	X	
42	16641 para 1.5C	Corrosion Technician Qualifications	X	
43	16641 para 1.5D	Design Documents	X	
44	16641 para 1.5E	Cathodic Protection System Test Reports	X	
45	16641 para 1.5F	Data and Analysis Reports	X	

TABLE I. Required submittal list - Completed.

END OF SECTION

SECTION 02050
DEMOLITION

PART 1 GENERAL

1.1 SUMMARY. Demolish existing ladders, cathodic protection system, and all warning lights. The extent of demolition work is shown on the drawings and the specifications. Demolition includes the complete removal and disposal of demolished materials, as shown on the drawings and specified herein.

1.2 TDEC NOTIFICATION: Coordinate with the Government representative to notify Tennessee Department of Environment and Conservation of demolition for this project 10 days before start of demolition.

1.3 SUBMITTALS

A. Proposed methods and operations of demolition for review and approval prior to the start of work.

PART 2 PRODUCTS - None

PART 3 EXECUTION

3.1 Dispose of non-lead demolished materials at the AEDC construction landfill, which is located approximately 2 miles west of the intersection of Avenue E and 6th Street.

3.2 Do not dispose of demolished materials containing lead in the AEDC construction landfill. See Section 02085 for lead disposal.

3.3 Conduct demolition operations and the removal of debris to ensure minimum interference with adjacent roads and fences.

3.4 Do not close or obstruct streets, walks, or other occupied or used facilities without concurrence from the Government representative. Provide alternative routes around closed or obstructed traffic ways. Provide traffic control including signs and barricades.

3.5 Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent personal injury and damage to adjacent buildings or other facilities.

3.6 Repair damages caused to adjacent facilities by demolition operations.

3.7 Maintain existing utilities that are to remain, keep them in service, and protect against damage during demolition operations. Do not interrupt existing utilities

serving occupied or used facilities except with the concurrence of the Government representative.

3.8 Minimize the amount of dust and dirt rising and scattering in the air. Provide two 15-pound fire extinguishers, using ammonium phosphate firefighting agent where demolition operations are being conducted.

3.9 Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to the condition existing prior to the start of the work.

3.10 Demolish existing construction where shown on the drawings, and remove from the site. Provide protective coverings as required to prevent damage to existing buildings, grounds, and equipment. Remove debris, rubbish, and other materials resulting from demolition from the site each day and transport to the AEDC construction landfill.

END OF SECTION

SECTION 02085
LEAD REMOVAL

PART 1 GENERAL

1.1 SUMMARY. This section applies to the removal and disposal of lead-containing materials and other heavy metals (barium, cadmium, silver, mercury, chromium, arsenic, and selenium).

1.2 CODES AND STANDARDS

A. AEDC Safety Standards:

1.	A6	User and Subcontractor Safety, 1996.
2.	A9	Hazard Communication, 1996.
3.	B1	Work Clearances, 2002.
4.	E17	Oil and Hazardous Substances Spill Response, 2002.
5.	E18	Managing Waste Containing Chemical and Petroleum Products, 1998.
6.	E19	Lead and Heavy Metals, 1997.

B. American National Standards Institute (ANSI) Standards:

1.	Z9.2-01	Fundamentals Governing the Design and Operation of Local Exhaust Systems.
2.	Z88.2-92	Practices for Respiratory Protection.

C. Code of Federal Regulations (CFR):

1.	29 CFR 1910.134	Respiratory Protection, 2003.
2.	29 CFR 1910.1200	Hazard Communication, 2003.
3.	29 CFR 1926.55	Gases, Vapors, Fumes, Ducts, and Mists, 2003.
4.	29 CFR 1926.57	Ventilation, 2003.
5.	29 CFR 1926.62	Lead Standard, 2003.
6.	40 CFR 260	Hazardous Waste Management Systems: General, 2002.
7.	40 CFR 261	Identification and Listing of Hazardous Waste, 2002.
8.	40 CFR 262	Generators of Hazardous Waste, 2002.
9.	49 CFR 172	Department of Transportation (DOT) Regulations for Use of Hazardous Materials Tables and for Communication, 2003.
10.	49 CFR 178	DOT Specifications for Packaging, 2003.

D. Environmental Protection Agency (EPA) Document:

1.	SW-846	Proposed Sampling and Analytical Methodologies for Additions to Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 1984.

E. Steel Structures Painting Council (SSPC) Standard:
1. Guide 6-97 Guide for Containing Debris Generated During Paint Removal Operations.

F. Underwriters Laboratories, Inc. (UL) Standard:
1. 586-00 Safety High-Efficiency, Particulate, Air Filter Units.

1.3 DEFINITIONS

A. Action level: Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 µg/m^3 averaged over an 8-hour period. As used in this section, "30 µg/m^3" refers to the action level.

B. Area monitoring: Sampling of lead concentrations within the lead-control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

C. Change rooms and shower facilities: Rooms within the designated physical boundary around the lead-control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

D. Clearance level: Clearance prior to primer application: Before primer application, a detailed visual inspection by the Government representative for unprepared surfaces and visible dust will be conducted. Any visible dust shall be assumed to be lead contaminated. The work area including enclosure floors, walls, and ceiling shall be cleaned. This includes all durable equipment such as scaffolds, staging, blast hoses, and hardware. If visible dust or unprepared surfaces are identified, the work area shall be re-cleaned, and the inspection will be repeated. The outer enclosure shall remain intact, and HEPA-filtered exhaust shall be maintained until final clearance air and inspection are conducted before enclosure removal as indicated in paragraph 3.9. Any personnel entering the work area are required to wear protective coveralls, head cover, gloves, and other necessary equipment, including respirator, until final clearance sampling of 3µg/m^3 is obtained. No painting of any kind shall be conducted until the enclosure and work area have been inspected by the Government representative. The Government shall document findings in writing, either in a formal document or by notation, in the contractor's field log.

Final clearance before containment movement: Prior to the moving or removal of enclosures used for lead abatement, air samples will be taken by the Government representative to ensure that airborne levels of lead are at or below 3 µg/m^3. In addition, a detailed visual inspection will be conducted by

the Government representative for all surfaces and equipment in the containment or control area. Surfaces include any portion of the containment including walls, ceilings, floors, scaffolds, and any equipment or objects that are present in the containment or that have been used in the containment. The inspection will be conducted by wiping a clean cloth across all surfaces and inspecting the cloth for evidence of any dust. The finding of any dust on the cloth will fail the inspection, and the contractor shall re-clean the entire containment until a detailed inspection is passed. All dust will be assumed to be lead or heavy metal contaminated. This method will be used before moving containments or enclosures. Following final paint removal, tarps or other materials which have been used as part of the containment enclosures shall be drummed and prepared for disposal as hazardous waste. If the contractor chooses to clean the tarps and reuse the material or remove it from AEDC, then wipe samples and/or microvac samples will be collected from representative surfaces to determine if the tarps have been cleaned to a level of 500 µg /ft^2 or less. Supports, cables, and other equipment shall be sampled at the discretion of the Government to determine if the equipment has been adequately cleaned. This equipment, as a minimum, shall pass the white cloth test but may be held to a level of 500 µg /ft^2 or less if the Government determines that it is necessary. If any one sample exceeds 500 µg /ft^2 , then all supports and other equipment shall be re-cleaned. Used tarps shall not be removed from AEDC unless they have been cleaned to a level of 500 µg /ft^2. Any materials which have been used for structural support of the enclosure shall be cleaned and inspected by the Government representative.

E. Decontamination room: Room designated for removal of contaminated personal protective equipment (PPE).

F. Designated lead-abatement supervisor: A person who has attended any three- to five-day lead-abatement course taught in the United States. The person shall be knowledgeable of Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), and other Government regulations.

G. Eight-Hour Time Weighted Average (TWA): Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

H. Grit blasting: Perform grit blasting as specified in the paint schedule under item description, surface preparation requirements, and page 1 of 10 in Appendix 1.

I. High-efficiency particulate air (HEPA) filter equipment: HEPA-filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high-efficiency particulate filter means it is 99.97 percent efficient against 0.3-micron-size particles. This

equipment may be containment exhaust systems or hand-held paint-removal equipment such as peeners, needle-guns, grinders, or sanders.

J. Lead: Metallic lead, inorganic lead compounds, and organic lead soaps.

K. Lead-control area: An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint-removal operations. The lead-control area is isolated by physical boundaries to prevent unauthorized entry of personnel.

L. Lead-permissible exposure limit (PEL): Fifty $\mu g/m^3$ as an 8-hour TWA as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following formula: PEL (μg lead/m^3) = 400/ hrs. worked per day.

M. Microvac: Alternate sampling method for surfaces that are not conducive to wipe sampling. Sampling is conducted using a 37-mm air-sampling cassette with 0.8-micron filters at a flow rate of approximately 4 liters per minute. Samples are vacuumed from a 6 in^2 area unless conditions require a smaller or larger sample area. Results will be reported in μg /ft^2.

N. $\mu g/m^3$: Micrograms per cubic meter of air (refers only to lead in this document).

O. μg /ft^2: Micrograms per square foot of surface (Refers only to lead in this document).

P. Personal monitoring: Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour TWA concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.

Q. Physical boundary: Area physically roped or partitioned off around an enclosed lead-control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead-control area but within the roped-off area."

R. Visible dust: Visible dust is any dust which can be seen by the naked eye either found on objects or as seen on a clean dry white cloth.

S. White cloth test: The wiping of surfaces using a clean white dry cloth. The wiping of the cloth should be done with moderate hand pressure without scrubbing. The presence of <u>any</u> dirt, dust, or debris shall result in a failed test.

1.4 SUBMITTALS.

A. Evidence satisfactory to the Contracting Officer that the firm performing lead abatement has at least one designated employee on site during all abatement activity who has attended a lead-abatement course taught in the United States and who is knowledgeable in all aspects of lead abatement. Show this by course certification and description of past lead-abatement experience which includes a list of previous clients and a resumé. Have physically on each individual job site at least one such designated supervisor directly responsible for the work whenever any phase of the project is in progress. Multiple enclosures being worked at the same time shall require individual lead-abatement supervisors responsible for each enclosure.

B. Written certification that all employees involved in lead abatement have received training and medical examinations as required by 29 CFR 1926.62. Certification includes respirator fit-test and training records and a copy of the respiratory protection program. Include with the certifications, dates of the most recent training, medical examinations and a physician's statement indicating that workers are physically able to perform lead-abatement work and use the required respiratory and general body protection. Provide this information for all personnel including management and any air-monitoring personnel on the job site before their first entry within the job site. Training shall be accomplished prior to the time of initial job assignment. Keep the job information current for all employees during all phases of the job.

C. Any citation or notice of violation from any Government agency issued as a result of work performed under this contract or any contract engaged in during the last 3 years. Submit a brief explanation of any cited incident. If none have been received, submit certification to that effect.

D. Environmental, Health, and Safety Plan that addresses all environmental, health, and safety aspects of the job. Submit this plan within 30 calendar days after award of the contract and before any field work begins. Include methods to ensure safety including a lockout/tagout plan; job safety analysis; tool box safety meeting minutes; accident reports and investigations; lead-testing data/certification; fall protection systems; shop drawings; procedures for disposing waste, scrap, and excess materials; and procedures for work involving transportation or disposal of hazardous waste. The plan shall address all other environmental, health, and safety concerns associated with the job, including a fire safety plan and procedures for addressing other emergencies within the work area and in compliance with 29 CFR 1926.55 and a hazardous waste management plan in accordance with 40 CFR 260 and with applicable requirements of federal and local hazardous waste regulations and shall address:

1. Identification of hazardous waste associated with the work.

2. Estimated quantities of wastes and/or hazardous wastes to be generated and disposed of.
3. Names and qualifications (experience and training) of personnel who will be working on site with hazardous waste.
4. List of the waste-handling equipment to be used in performing the work, to include cleaning, volume-reduction, and transport equipment.
5. Spill prevention, containment, and clean-up contingency measures to be implemented. Reference AEDC Safety Standard E17.
6. Work plan and schedule for waste containment, removal, and disposal. Waste shall be cleaned up and containerized daily.
7. Methods to control fugitive air emissions.
8. Methods to control employee exposure to lead during removal.
9. Methods to ensure safety including a lockout/tagout plan; job safety analysis; tool box safety meeting minutes; accident reports and investigations; lead-testing data/certification; fall protection systems; shop drawings; procedures for disposing waste, scrap, and excess materials; and procedures for work involving transportation or disposal of hazardous waste. The plan shall address all other environmental, health, and safety concerns associated with the job, including a fire safety plan and procedures for addressing other emergencies within the work area and in compliance with 29 CFR 1926.55.

E. A copy of the hazard communications program and certification that all employees have been trained concerning the hazard communications standards and the written program in accordance with 29 CFR 1910.1200 and AEDC Safety Standard A9.

F. A list of products to be used and a Material Safety Data Sheet (MSDS) for each. Products include, but are not limited to, aerosol sprays of any kind, wetting and cleaning agents, fuels, solvents, paints, etc. MSDSs will be kept in a notebook and will be indexed for easy reference. This MSDS notebook shall remain available to all employees on the job site at all times.

G. A detailed job-specific plan of the work procedures to be used in the removal of lead paint. The plan shall include a sketch showing the locations, size, and details of lead-control areas and location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation systems. Include in the plan eating, drinking, smoking, and restroom procedures; interface of trades; sequencing of lead-related work; collected wastewater (to include shower water) and paint debris disposal plan; air-sampling plan; respirators; protective equipment; and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 3 $\mu g/m^3$ are not exceeded outside the lead-control area. Include air sampling, training, strategy, sampling methodology, frequency, duration of sampling, and qualifications of air-monitoring personnel in the air-sampling portion of the plan. Obtain approval of the plan prior to the start of paint-removal work.

H. Air and substrate sampling reports.

I. Testing laboratory qualifications including the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne and substrate concentrations of lead. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation. Samples collected to determine if materials are hazardous waste shall be analyzed by a laboratory qualified to conduct such analysis following Environmental Protection Agency Document SW-846. Provide split samples of any materials or media to the Government as requested for Government analysis.

J. Air-monitoring results submitted within 24 hours following the monitoring, signed by the person performing the air monitoring, the employee who analyzed the sample, and the designated site superintendent responsible for the lead-abatement operation. See paragraph 3.2.B.3 for additional information.

K. A list of all equipment, including water, air filters, and respirators to be used, and manufacturer's literature showing that the equipment and material meet all EPA, OSHA, and ANSI standards for use in lead-abatement activities. Include certification that vacuum- and air-filtration devices are filtered with HEPA filters. Include operating instruction for paint-removal equipment.

L. Equipment rental notifications (see paragraph 1.5C).

M. Shower water sample test results.

1.5 EQUIPMENT

A. Respiratory protection requirements: Establish a respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134 and 29 CFR 1926.62. The Government will strictly enforce the OSHA "no facial hair/respiratory policy" for all personnel who wear respirators at any time during the job.
   1. Ensure workers are clean shaven daily immediately preceding their work shift and before wearing respiratory protection.
   2. Provide spectacle inserts to personnel wearing full-face respirators who normally wear spectacles; otherwise, spectacles shall not be worn in lead-abatement areas.

B. Special protective clothing: Furnish personnel who will be exposed to lead-contaminated dust with appropriate disposable protective whole-body clothing, head coverings, gloves, and foot coverings. Use coveralls having head covers and booties attached. Furnish appropriate disposable plastic or

rubber gloves to protect hands. Reduce the level of protection only after obtaining concurrence from the Government representative.

C. Rental equipment notification: If rental equipment is to be used during lead-containing paint handling and disposal, notify the rental agency in writing concerning the intended use of the equipment. Furnish a copy of the written notification to the Contracting Officer (see paragraph 1.4K).

D. Vacuum and negative-air machine filters: UL 586-labeled HEPA filters.

E. Decontamination: Completely decontaminate all ladders, vacuum cleaners, air machines, and other equipment used during abatement activities prior to removal from the abatement area. If they cannot be decontaminated, then dispose of them as hazardous waste.

F. Condition: Clean all equipment used at non-AEDC job sites prior to arrival at AEDC. Any contaminated equipment identified during inspection of incoming vehicles shall be removed from AEDC until cleaned. Any such equipment shall not be cleaned at AEDC. Do not remove any equipment used at AEDC that has not been decontaminated and inspected by the Government representative. All equipment and other articles are subject to inspection by Government representatives upon arrival or exit from AEDC. Contaminated equipment identified on out-going vehicles will be impounded by the Government until the contractor conducts adequate decontamination procedures.

PART 2 PRODUCTS

2.1 ABRASIVE MATERIALS (IF APPLICABLE)

A. Abrasive blasting materials shall meet the requirements as specified in the paint schedule under "Surface Preparation."

1. Limits on the composition of abrasive materials: The soluble metal content and the total metal content shall not exceed values which would cause a material to be classified as a hazardous waste as defined in 40 CFR 261.

PART 3 EXECUTION

3.1 PROTECTION

A. Notification: Notify the Government representative 30 days prior to the start of any paint-removal work.

B. Lead-control area requirements:

1. Establish a lead-control area by completely enclosing the area or structure where lead-containing paint-removal operations are to be performed or isolate using barrier ropes and signs if containment is not required.
2. When enclosures are not required, place polyethylene sheeting on the ground or floor of the work area and out from the building a distance of at least 20 feet. Cover non-moveable objects with protective covering such as polyethylene. Close and tightly lock doors and windows when working near doors or windows. Protect brick and walls from contamination and remove prior dust and debris by HEPA vacuum and wet wiping. If doors and windows will not tightly close, seal with polyethylene from the inside of the building. If storm windows must be removed to allow repainting of windows, wet wipe and HEPA vacuum the entire storm window (both sides) to remove any lead contamination.
3. When building occupants are allowed to remain in the premises provide a safe, lead free access to and from the building during the work and at the end of the day. Provide adequate security to the work area and equipment to prevent any hazard to the area occupants.
4. Contain removal operations by the use of a negative-pressure full-containment system. Also see paragraph 3.1.I.
5. Enclosures used to control lead emissions shall consist of the lead-abatement work area and a decontamination unit for personnel, consisting of a dirty equipment room, a shower equipped with hot and cold running water, and a clean change room for workers. A separate decontamination chamber shall be constructed for equipment decontamination and the safe passage of hazardous wastes from the work area to the outside. Removal of contaminated dust-collecting filters from the recycling abrasive blasting and vacuuming machines shall be accomplished in a manner to prevent the contaminated dust from entering the environment. All personnel assigned to changing filters and cleaning the machinery shall be fully clothed with approved protective clothing and equipment. The clean room shall be equipped with lockers where clean respirators and street clothes are stored. No contaminated articles shall enter the clean room. Contaminated articles shall remain in the work area until cleaned or disposed of as hazardous waste. The decontamination units shall be constructed contiguous to the work area (enclosure), and the shower shall be constructed in a manner that requires the worker to pass from the dirty room through the shower stall into the clean room. No worker may leave the barricaded area without first going through the decontamination area, showering, and fully decontaminating themselves.
6. Filter shower water through a filter system that will result in water filtration of 100 parts per billion or below. Collect water and sample to determine if lead levels in the water are below 100 parts per billion if tested by a qualified laboratory or 50 parts per billion if tested by an

approved field kit. If levels are below these concentrations, then the water may be discharged into the sanitary sewer. All water shall be collected and sampled before discharge using either a field measuring kit as described below or the results from a qualified laboratory. Sample results from the qualified laboratory shall be submitted to the Contracting Officer for approval prior to discharging the water. The Government representative may collect and test duplicate samples to ensure the integrity of the qualified laboratory performing the analysis. Field analysis conducted using portable test kits will be approved by the Government industrial hygienist prior to use. Colorimetric test kits, such as CHEMetrics, Inc., Cat. No. K-8350, are such kits. Any water tested using field kits that indicates lead levels above 50 parts per billion shall be refiltered and retested until field measurements are below 50 parts per billion or the water has been found to be less than 100 parts per billion using laboratory testing from a qualified laboratory. Sample results from the qualified laboratory shall be submitted to the Contracting Officer for approval prior to discharging the water. If field analysis is used, a Government representative will be present during all testing and field analysis. The holding tank used for the collection of contaminated water will be locked and unlocked by the Government representative to prevent the release of contaminated water to the environment before adequate filtering. The contractor shall provide the means of locking the tank by the Government. However, the Government will provide the lock itself. The contractor shall maintain the filtration system to ensure maximum water filtration. This includes the replacing of old filters, filter media, pumps, hoses, etc., on a routine basis and as needed.

7. Enclosures used for lead abatement shall be constructed of materials strong enough to withstand environmental elements (i.e., wind, rain, snow) when outside. The containment shall comply with a Class 1 containment system as described in SSPC Guide 6. The containment shall be made of impermeable walls with rigid or flexible framing, fully sealed joints, airlock entryways, and HEPA-filtered negative air achieved by forced air flow (verified by instrument monitoring). Prevent the accumulation of dust and debris in the seams, folds, and pockets of the containment. Also see specification Section 09900, paragraph 3.1. Air flow in the containment shall be maintained at a pressure differential of minus 0.02 inch of water. Air flow in the containment shall be maintained at a minimum of 100 ft/min for the cross-draft ventilation and at least 60 ft/min for the down-draft ventilation. Construct hygiene facilities for decontamination of workers and equipment similar to the main containment. Construct doors so that flaps completely isolate the enclosure in the event of air exhaust failure and allow easy access for personnel and equipment. The clean room shall be large enough to accommodate at least three workers at any one time. Prevent direct viewing into the shower, clean room, or dirty room by other personnel by constructing the walls and ceiling of these areas of black polyethylene or

similar material. Provide detailed specifications, drawings, and load calculations of containment structure for 100-percent containment of lead emissions, grit, and dust. If the containment is to be used for abrasive blasting, blast shields shall be used to protect the outside walls of the containment from damage by blast media.

C. Protection of existing work to remain: Perform paint-removal work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better.

D. Boundary requirements: Provide physical boundaries around the lead-control area by roping off the area. Ensure that airborne concentrations of lead will not exceed 3 µg/m^3 outside the lead-control area or enclosure.

E. Change room and shower facilities: Provide clean change rooms and shower facilities within the physical boundary around the designated lead-control area in accordance with requirements of 29 CFR 1926.62 and as outlined in paragraph 3.1.

F. Mechanical ventilation system:
   1. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.
   2. Local exhaust system: Provide a local exhaust system in the lead-abatement area (enclosure) in accordance with ANSI Z9.2. Equip exhaust with absolute HEPA filters. HEPA-filtered air will be exhausted to the outside of buildings when work is conducted inside buildings. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent unsealed areas. Provide continuous 24-hour-per-day monitoring of the pressure differential with an automatic recording instrument. Filters on vacuums and exhaust equipment shall conform to ANSI Z9.2. Change prefilters and HEPA filters often enough to ensure that lead concentrations at the exhaust are at or below 3 µg/m^3. Provide and install a back-up HEPA air-exhaust ventilation system to be used in the event of primary system failure. Do not use a system with a remote filter housing inside the lead-removal area.

G. Personnel protection: Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead-control area. No one shall be permitted in the lead-control area unless they have been given appropriate training and protective equipment. Eating, drinking, and smoking are permitted within the barricaded area in specially designated lead-free areas. Workers shall be decontaminated of all lead before entering this designated area.

H. Warning signs: Provide warning signs at approaches to lead-control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

I. During building renovations where abrasive blasting is not used and paint must be removed by other means such as HEPA shrouded mechanical-removal equipment, critical barriers and polyethylene enclosures may be used. The requirement for showers and HEPA negative-pressure exhaust shall be dependent on air concentrations. If air concentrations are below the action level for lead, then showers shall not be required. Hand and face washing facilities shall be required. Submit methods of removal and control as required in paragraph 1.4.D. If work is done outside, then air concentrations within the work area shall be within acceptable limits as indicated in paragraph 3.1.D.

3.2 WORK PROCEDURES

A. Perform removal of lead-containing paint in accordance with the approved lead-containing paint-removal plan. Use procedures and equipment required to limit occupational and environmental exposure to lead when lead-containing paint is removed in accordance with 29 CFR 1926.62 and 40 CFR 262, except as specified herein. (Dispose of removed paint chips and associated waste in compliance with federal and local requirements.) The hazardous waste shall be properly drummed and labeled as required by 49 CFR 172 prior to being moved by the contractor to an accumulation point, which is within one mile of the job site (see paragraph 3.9F).

1. Personnel exiting procedures: Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn during the work day:
   a. Vacuum themselves off.
   b. Remove protective clothing in the decontamination room, and place them in an approved impermeable 6-mil polyethylene disposal bag.
   c. Shower.
   d. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.
   e. In keeping with 29 CFR 1926.62, workers leaving the lead removal enclosure shall vacuum, change dirty coveralls, and wash hands, arms, and neck when taking breaks. They shall shower at the end of the day or if they intend to leave the barricaded area. They shall not bring lead contamination from inside the lead removal enclosure.

B. Air monitoring: Monitor airborne concentrations of lead in accordance with 29 CFR 1926.62 and as specified below:

1. Monitoring during lead-abatement work: Provide personnel and area monitoring and establish an 8-hour TWA during the first exposure to airborne lead to document exposure levels and determine respiratory protection requirements. Provide continuous area monitoring during each work shift inside the lead-control area, outside the entrance to the lead-control area, and at the exhaust opening of the local exhaust system. If monitoring outside the lead-control area shows airborne concentrations above 3.0 µg/m3, stop all work, notify the Government representative immediately, and correct the condition causing the increase. Conduct air sampling following OSHA and NIOSH guidelines which includes field calibration of sample pumps immediately before and after air sampling.
2. Collect personal air-monitoring samples on employees who are anticipated to have the greatest risk of exposure. In addition, take air-monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.
3. Submit the results of all air samples taken in support of the contract within 10 days following their collection. Include the location of their collection (for example, area [where], personnel [who], sample number, start and stop times, dates of collection, duration of sampling, flow rate in liters per minute, sampling volume, total lead concentration in µg/m3, detection limit of the analysis, TWA of the representative employee's exposure, name of the laboratory, and name of the person collecting the sample and analyzing the samples.) This information shall be submitted in a formal report to the Contracting Officer. Within 24 hours of sample collection, make available for review to the Government representative (project manager) the results of sampling. These may be in the form of laboratory reports or rough-draft field data. Make field notes used at the job site during sample collection available at any time to the Government representative upon request. Notify the Contracting Officer immediately of exposure to lead at or in excess of 3 $\mu g/m^3$ outside the lead-control area.
4. Monitoring after final clean-up: Provide area monitoring of lead concentrations and establish an air-quality level of 3 $\mu g/m^3$ or less after final clean-up. Before moving or removing the enclosure of the lead-abatement control area, the Government representative will conduct a visual inspection of the area to determine its cleanliness. Once the visual inspection has been passed, the Government representative will collect clearance air samples to determine lead air concentrations. If the air samples indicate levels above 3 $\mu g/m^3$, then the enclosure shall be re-cleaned by the contractor and the visual inspection and clearance air sampling repeated. This shall continue until a passing inspection and clearance sample are obtained. The contractor shall assist the

Government representative to ensure adequate inspection of all surfaces of the enclosure and work areas. Also see paragraph 1.3.D.

C. Once the visual inspection and air samples meet necessary requirements, remove the enclosure.

3.3 LEAD-CONTAINING PAINT REMOVAL

A. Comply with the applicable procedure in Annex B, AEDC Safety Standard E19, and the following: Manual or power sanding/ grinding of interior and exterior surfaces is not permitted unless accomplished in enclosure. Also see paragraph 3.1.B and I. Remove paint within the areas designated on the drawings and in the paint schedule in order to completely expose the substrate. Take whatever precautions are necessary to minimize damage to the underlying substrate.

1. Mechanical paint removal and blast cleaning: Perform mechanical paint removal and blast cleaning in lead-control areas using negative-pressure full-containment with HEPA-filtered exhaust. Collect paint residue and spent grit (used abrasive) from blasting operations for disposal in accordance with CFR and local requirements.

B. The abrasive blasting and vacuum filtering system used to collect residue paint and grit blast shall be contained in an HEPA-filtered exhausted enclosure to ensure that the emptying of residue, the maintenance of systems, or the replacement of filters are done in an enclosed restricted area that shall prevent the contamination of the outside work area. This enclosure area shall be constructed in accordance with the requirements for the main enclosure and will be inspected and cleared by the Government representative prior to its removal as indicated in paragraph 3.9.

C. Do not conduct paint removal if wind speeds at the job site are greater than 20 miles per hour. In addition, work shall stop and cleanup of all debris must occur before any precipitation begins.

D. Do not leave debris on polyethylene or other parts of the work area overnight even if the work is not complete. Clean up all debris and contaminated polyethylene at the end of each shift.

3.4 CLEARANCE PRIOR TO PRIMER APPLICATION-

A Before primer application, a detailed visual inspection by the Government representative for unprepared surfaces and visible dust shall be conducted. Any visible dust shall be assumed to be lead contaminated. Also see paragraph 1.3.D. The work area including enclosure floors, walls, and ceiling shall be cleaned. If visible dust or unprepared surfaces are identified, the work area shall be re-cleaned and the inspection will be repeated. The outer

enclosure shall remain intact and HEPA-filtered exhaust shall be maintained until final clearance air and inspection is conducted before enclosure removal as indicated in paragraph 3.10. Any personnel entering the work area are required to wear protective coveralls, head cover, gloves and other necessary equipment including respirator until final clearance sampling of 3µg/m3 is obtained.

3.5 SAFETY

A. Ensure the safe passage of persons around the area of work. Comply with AEDC Safety Standard A6. Conduct operations to prevent injury to personnel and damage to existing equipment and structures.

3.6 UTILITIES

A. Do not interrupt existing utilities or commence power outages without written permission from the Government representative. Obtain an approved Work Clearance in accordance with AEDC Safety Standard B1 from the Government representative prior to interrupting utilities. Do not remove lead from active steam, electrical lines, or high-pressure lines. Wait for appropriate utility outages. Provide backflow-prevention devices as required to prevent cross-contamination of water supplies.

3.7 COMMUNICATION DEVICES

A. Do not use any two-way communication devices unless pre-approved by the AEDC Security Police.

3.8 WORK CLEARANCES

A. Obtain work clearances as required by AEDC Safety Standard B1. Perform hazard analysis to ensure all possible health hazards (e.g., toxic gases) have been evaluated and properly controlled. Before entering into a work space, make oxygen and Lower Explosive Limit (LEL) measurements using an NIOSH-approved 0_2/LEL metering device. While persons are working, designate a stand-by person to remain outside who has been trained within the last 12 months in cardiopulmonary resuscitation (CPR) by the American Red Cross or American Heart Association.

3.9 CLEAN-UP AND DISPOSAL

A. Clean-up: Maintain surfaces of the lead-control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area except if done in HEPA-filtered negative pressure containment. At the end of each shift and when the paint-removal operation

has been completed, clean the area of visible lead paint contamination by vacuuming with an HEPA-filtered vacuum cleaner. Prevent ground contaminants by enclosing the work area as specified in paragraph 3.1 Pre-clean concrete, asphalt, or roof areas of visible paint chips and obvious visible lead contamination prior to enclosure construction to remove visible contamination already present in the work area. Following completion of containment work and removal, or after the containment has been moved to a new location, post-clean all visible debris from the area that has just been completed. Post-cleaning includes the removal of gravel or soil to a depth of one inch in soil or graveled areas. Post-cleaning also includes the replacement of gravel or soil from the area where they have been removed. Asphalt, concrete, roofs, or other solid surfaces that were pre-cleaned shall be post-cleaned as necessary to remove any debris generated during the work. This includes any part of the work area inside or outside the containment where lead debris may be present. The containment area includes but is not limited to a distance of 10 feet in all directions from the location of the containment and inside the barricaded work area. The contractor shall clean up any debris and contamination generated by the work. If there is a breach of containment, all work shall stop and the breach shall be corrected and the area which has become contaminated shall be cleaned. This includes contaminated soil, concrete, asphalt, test equipment, etc., which have become contaminated as a result of the work. This applies to any breach by any cause.

B. Visual inspections: Visually inspect the work area after pre-cleaning and before placing any polyethylene sheeting. Re-clean and inspect any area where cleaning has not been adequately done before placing polyethylene sheeting. Inspect enclosures for adequacy prior to removing lead. Do not start abatement procedures prior to release by a Government Industrial Hygienist who will visually inspect the area for cleanliness and enclosure adequacy.

C. Inspection assistance: The designated lead-abatement supervisor shall assist in the visual inspection of all areas (enclosure areas cleaned, drums, trucks, and equipment used in lead abatement) as requested by the Government representative. This includes any inspection activity required.

D. Testing of lead-containing paint residue and used abrasive: Where indicated or when directed by the Government representative, test lead-containing paint residue and used abrasive in accordance with 40 CFR 261 and AEDC Safety Standard E18.

E. Non-hazardous debris disposal: Transport debris, rubbish, demolition waste, and other non-hazardous materials resulting fom work from the site to the construction landfill which is located approximately 2 miles west of the intersection of Avenue E and 6th Street. Do not place edibles or garbage in the construction landfill; use existing dumpster boxes. Dispose of all material

contaminated by lead as hazardous waste in compliance with AEDC Safety Standard E18.

F. Hazardous waste disposal
   1. Where hazardous waste (as identified or listed by 40 CFR 261) is generated, follow the procedures given in AEDC Safety Standard E18 for storing and turning in hazardous waste. These procedures include the requirement for completion of Forms GC-565 and GC-1337, which will be furnished by the Government representative. Return the completed forms to the Government representative prior to transporting the drums to the accumulation point.
   2. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and clothing, which may produce airborne concentrations of lead particles.
   3. Store removed paint, lead-contaminated clothing and equipment, and lead-contaminated dust and cleaning debris into U. S. Department of Transportation 49 CFR 178-approved 55-gallon drums which shall be provided by the contractor. Test the contents to determine the hazardous characteristics, and submit the test results to the Government representative as described previously in paragraph 1. The contractor shall label and move the waste to a designated accumulation point in accordance with 40 CFR 262 and 49 CFR 172. The Government will be responsible for the further transportation and disposal of the waste.
   4. Do not place any hazardous waste, as defined in 40 CFR 261, in any AEDC landfill.

3.10 LEAD-ABATEMENT COMPLETION

A. Samples and tests: Do not remove protective barricades or enclosures until concurrence is received in writing from the Government representative. The Government representative will visually inspect and conduct a white cloth test on the surfaces of both the enclosure and abated substrate for visible dust contamination, and the contractor shall re-clean all areas as required. Also see paragraph 1.3.D. If re-cleaning is required, monitor airborne lead concentrations during and after re-cleaning. Once the visual inspection has been made and wipe and/or microvac samples indicate clean surface levels, clearance air monitoring will be accomplished. If airborne lead concentrations exceed 3 $\mu g/m^3$, re-clean the area. Clearance monitoring will be repeated by the Government representative as necessary. HEPA-filtered air systems shall be operated continually until adequate clearance levels are met. In addition to air and wipe samples, soil, gravel, and water samples will be taken in the work area to determine if lead contamination in the area is no greater than 3.7 parts per million above pre-construction levels in soil and gravel or 100 parts per billion in water regardless of the pre-construction levels. Sample results below these limits are required before enclosures or barricades are removed. Shower water shall be sampled prior to disposal to ensure that the 100-parts-

per-billion level is met. See paragraph 3.1.B.6. Analysis of Government-collected and -tested air and wipe samples may take 1 1/2 to 3 work days, with bulk and water analysis taking up to 5 work days. Keep the area sealed, barriers intact, and HEPA-filtered air exhaust ventilation in operation until the results of final air samples are received.

B. Work area inspection: The Government representative will visually inspect the general work area following enclosure removal to ensure the work area has been adequately cleaned and to ensure that no damage has been done to buildings, structures, or equipment.

END OF SECTION

SECTION 02516
DISINFECTION OF WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes the disinfection of elevated potable water storage tank.

1.2 CODES AND STANDARDS

A. American Water Works Association (AWWA) Standard:
1. C652-02 Disinfection of Water-Storage Facilities.

1.3 SUBMITTALS

A. Disinfection Plan.
1. Contractor shall provide disinfection plan for approval prior to beginning disinfection. Contractor shall provide all equipment and materials used to disinfect the tank in accordance with AWWA C652, as modified herein.
a. Include preliminary washing and disinfection.
b. Chlorination method 2 is preferred.
c. The Government representative (water treatment operator) will provide sampling and laboratory testing.

Plan shall include type and form of disinfectant to be used, sequence of activities to accomplish work, and safety plan.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with AWWA C652.

PART 2 PRODUCTS - None

PART 3 EXECUTION

3.1 Coordinate disinfection with the Water Treatment Plant lead operator.

3.2. After all work in tank is completed and before the tank is placed in service, disinfect by chlorination and fill the tank up to the maximum water level.

3.3 Repeat disinfection procedure at no additional cost to the Government until satisfactory results are obtained.

3.4 Dispose of waste water as approved by Government, and without damage to public or private property as required by the Government representative.

END OF SECTION

SECTION 03930
CONCRETE REHABILITATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes preparation of concrete and application of repair materials for rehabilitation of concrete surfaces.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standards:
   1. C150-02 Portland Cement.
   2. C404-97 Aggregates for Masonry Grout.
   3. C882-99 Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
   4. D638-02 Tensile Properties of Plastics.
   5. D695-02 Compressive Properties of Rigid Plastics.
   6. D790-03 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.3 SUBMITTALS

A. Product data: Product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

B. Manufacturer’s instructions: Mixing instructions.

C. Manufacturer's certificate: Certify products meet or exceed specified requirements.

1.4 QUALIFICATIONS

A. Materials manufacturer: Company specializing in manufacturing products specified in this section.

B. Applicator: Company specializing in concrete repair.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with instructions for storage, shelf life limitations, and handling.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

A. Epoxy Resin: Two-part epoxy adhesive containing 100 percent solids, meeting the following minimum characteristics:

Characteristic	Test Method	Results
1. Bond Strength	ASTM C882	2,700 psi
2. Tensile Strength	ASTM D638	6,600 psi
3. Elongation	ASTM D638	2 percent at 7 days 70ºF
4. Flexural Strength	ASTM D790	8,000 psi
5. Compressive Strength	ASTM D695	6,500 psi

B. Bonding agent: Polyvinyl acetate emulsion, dispersed in water while mixing, non-coagulant in mix, water resistant when cured.

C. Portland cement: ASTM C150, gray color.

D. Sand: ASTM C404; uniformly graded, clean.

E. Water: Clean and potable.

F. Cleaning Agent: Commercial muriatic acid appropriate strength.

2.2 MIXING EPOXY MORTARS

A. Mix epoxy mortars for purpose intended.

B. Mix components in clean equipment or containers. Conform to pot life and workability limits.

2.3 MIXING CEMENTITIOUS MATERIALS

A. Mix cementitious mortar for purpose intended.

B. Include bonding agent as additive to mix.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

A. Clean concrete surfaces of dirt, laitance, corrosion, or other contamination; wire brush using water and/or acid; rinse surface and allow to dry.

B. Flush out cracks and voids with chemical solvent, muriatic acid, or water to remove laitance and dirt. Chemically neutralize by rinsing with water.

C. Provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than depth of crack to be filled or port size diameter no greater than thickness of crack. Provide temporary seal at concrete surface to prevent leakage of adhesive.

D. For areas patched with epoxy mortar, remove broken and soft concrete 1/4-inch deep. Clean surfaces mechanically; wash with acid; rinse with water.

3.3 REPAIR WORK

A. Repair exposed structural, shrinkage, and settlement cracks of concrete by epoxy injection, epoxy application, bonding agent, and/or cementitious paste method.

B. Repair spalling. Fill voids flush with surface.

3.4 APPLICATION - EPOXY MORTAR

A. Trowel apply mortar mix to required thickness to match existing level surface. Tamp into place filling voids at spalled areas.

B. For patching honeycomb, trowel mortar onto surface, work mortar into honeycomb to bring surface flush with surrounding area. Finish trowel surface to match surrounding area.

C. Cover exposed steel reinforcement with epoxy mortar, feather edges to flush surface.

3.5 APPLICATION - CEMENTITIOUS MORTAR

A. Apply roller coating of bonding agent to damp concrete surfaces. Provide full surface coverage.

B. Apply cementitious mortar by steel trowel to required thickness to match existing surrounding area. Tamp into place filling voids at spalled areas. Work mix into honeycomb.

C. Damp cure cementitious mortar for four days.

3.6 FIELD QUALITY CONTROL

A. Test concrete for calcium chloride content during execution of the work.

END OF SECTION

SECTION 05050
METAL FASTENING

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to structural welding as indicated on approved shop drawings and specified herein.

1.2 REFERENCE

A. American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME B&PVC) Standards:
   1. SEC II-C-98 Welding Rods, Electrodes, and Filler Metals-Non Interfiled.

1.3 CODES AND STANDARDS

A. American Welding Society (AWS), Inc. Standards:
   1. D1.1-02 Structural Welding Code-Steel.
   2. Z49.1-99 Safety in Welding, Cutting, and Allied Processes.

1.4 SUBMITTALS. Furnish the following data.

A. Certification of welders and qualification of weld procedures. Certify welders and qualify procedures in accordance with the applicable requirements of AWS D1.1. Perform no welding before receiving Contracting Officer's approval of welder certifications and weld procedure qualifications.

1.5 SAFETY. Conform with AWS Z49.1 for safety precautions.

PART 2 PRODUCTS

2.1 EQUIPMENT, ELECTRODES, WELDING WIRE AND FLUXES: Capable of producing satisfactory welds when used by qualified welders and with qualified procedures, and complying with the requirements of ASME (B&PVC) SEC II-C.

PART 3 EXECUTION

3.1 WELDING: Perform welding where indicated on approved shop drawings and in conformance with provisions of AWS D1.1.

END OF SECTION

SECTION 05500
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated ferrous metal.

1.2 RELATED SECTIONS

A. Section 09900: Painting

1.3 REFERENCES

A. American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME B&PVC) Standards:
   1. SEC II-C-98 Welding Rods, Electrodes, and Filler Metals-Non Interfiled.

B. American Society for Testing and Materials (ASTM) Standard:
   1. A36-03 Carbon Structural Steel.
   2. A108-99 Steel Bars, Carbon, Cold-Finished, Standard Quality.
   3. A283-03 Low and Intermediate Tensile Strength Carbon Steel Plates.
   4. A307-02 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

C. American Welding Society, Inc. (AWS) Standards:
   1. A2.4-98 Symbols for Welding, Brazing and Nondestructive Examination.
   2. D1.1-02 Structural Welding Code-Steel.

1.4 SUBMITTALS

A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

B. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

A. Welding Materials: ASME ASME SEC II-C; type required for materials being welded.

B. Steel sections: ASTM A36.

C. Steel bars: ASTM A108.

D. Plates: ASTM A283.

E. Bolts, nuts, and washers: ASTM A307.

F. Welding materials: AWS D1.1; type required for materials being welded.

2.2 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on shop drawings.

D. Perform field structural welding in accordance with AWS D1.1.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

END OF SECTION

SECTION 05511
STEEL LADDERS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes new steel vertical ladders which shall meet industry codes and standards and shall match existing water tank ladders in appearance and placements. Work includes but is not limited to the following:
   1. Vertical ladder from ground to transition platform.
   2. Transition ladder from transition platform to walk platform.
   3. Revolving ladder for dome.
   4. Interior ladder.
   5. Riser ladder.
   6. 8-foot lockable ladder barrier.

B. Related sections:
   1. Section 05050 – Metal Fastenings.
   2. Section 05500 – Metal Fabrication.

1.2 CODES AND STANDARDS:

A. American Society of Safety Engineers (ASSE) Standard:
   1. A14.3-92 Safety Requirements for Fixed Ladders.

B. American Society of Testing and Materials (ASTM) Standard:
   1. A36-03 Carbon Structural Steel.

D. American Water Works Association (AWWA) Standard:
   1. D100-96 Welded Steel Tanks for Water Storage.

E. Code of Federal Regulations (CFR):
   1. 29 CFR 1910.27 Fixed Ladders, 2003.

1.3 SUBMITTALS

A. Product data: Manufacturer's data sheets indicating materials of construction.

B. Shop drawings: Drawings prepared for this project, showing construction dimensions and details, placement of ladders and relationship of ladders to other construction, and methods of anchorage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Ashley Steel

B. Approved equal

2.2 COMPONENTS

A. Ladders: Provide welded ladders that comply with OSHA 29 CFR 1910.27, ASSE A14.3, AWWA D100, and local building codes, with all edges rounded, clean, smooth, and burr free. ASTM A36 Steel and ASSE A14.3.

B. Fall arrestor: North Safety Products "Saf-T-Climb" System or equal.
   1. Installed by ladder manufacturer.
   2. Rails: Stainless steel, Type 304 or Type 316L.

C. Anchor bolts: Hot-dipped galvanized or stainless steel bolts; diameter as specified by ladder manufacturer; length as required to provide adequate anchorage into substrate.

D. Ladder stamp: Provide stamp on side bar at base of ladder with manufacturer’s name and date of manufacture.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Anchor securely using welded connections, fasteners specified by manufacturer or others of equivalent or greater strength and corrosion resistance.

C. All splices and connections shall be a smooth transition and shall be designed to ensure full structural continuity of the side rails. Provide for expansion due to thermal changes at splices to prevent buckling or buildup of stresses in the side rails.

D. Fastenings shall be an integral part of fixed ladder design.

END OF SECTION

SECTION 09900
PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Provide painting in accordance with AWWA D102, and as specified herein.

B. Surface preparation and field application of high performance coating systems to items and surfaces scheduled. Prepare shop-primed surfaces which are to receive finish coat(s). Spray painting application shall be permitted at the interior of the water tank.

C. Do not paint metal surfaces of anodized aluminum, stainless steel, copper, bronze, and similar finished materials.

D. Do not paint mechanical and electrical parts, such as valve operators, linkages, sensing devices, motor shafts, and moving parts of operating units.

E. Do not paint signage or equipment manufacturer's information data plates.

F. For specific paint details see Appendix I.

1.2 SUBMITTALS

A. Paint manufacturers' product and application data sheets for each paint product.

B. Manufacturers' material safety data sheets for each paint product.

C. Paint manufacturers' certifications that materials meet or exceed requirements outlined in Part 2.

D. Minutes and signatures of attendees to regularly scheduled (at least weekly) safety meetings.

E. Detailed testing plan: Identify certification of test reports, the testing agency and its certifier, and the proposed type, location, and frequency of testing. The following tests are the minimum required:
   1. Ambient conditions.
   2. Wet film thickness.
   3. Dry film thickness.
   4. Surface profile.
   5. Destructive tests for dry film thickness.

F. Test results: Document all test dates, test locations, type of tests, number of tests, and test results. Make documents available to the Contracting Officer on request and submit to the Contracting Officer within 30 days of completion of each test series.

G. Certification of contractor-furnished paint inspector's qualifications.

H. Plan for providing safety rigging, netting, high lifts, crane baskets, scaffolding, and other methods of safe access and working conditions for workers 6 feet above the ground.

I. Power tool manufacturer's product data and performance criteria for power tools used to remove paint from metal surfaces. Tools shall use needle, abrasion, or grinding-type attachments with a vacuum system to collect, filter, and contain paint, that contain heavy metals.

J. Paint color samples, industrial finishes.

K. Certification of confined space training for all contractor employees or sub-contractor employees.

L. Paint work schedule.

1.3 QUALITY ASSURANCE

A. Prepare a 48- by 48-inch field sample of finishes on substrate to be painted when requested by the Government representative. Sample to be identical to specification for surface preparation, application, and color.

1.4 CODES AND STANDARDS: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are specified.

A. AEDC Safety Standards:

1.	B1	Work Clearances, 2002.
2.	D8	Portable Power Tools, 1997.
3	E19	Lead and Heavy Metals, 1997.
4.	F4	Respiratory Protection, 1998.

B. American Society for Testing and Materials (ASTM) Standards:

1.	B117-02	Operating Salt Spray (Fog) Apparatus.
2.	D16-00	Standard Terminology for Paint, Related Coatings, Materials, and applications.
3.	D1172-02	Standard Guide for pH of Aqueous Solutions of Soaps and Detergents.

4.	D4060-01	Abrasion Resistance of Organic Coatings by the Taber Abraser.
5.	D4541-02	Pull-Off Strength of Coatings Using Portable Adhesion Testers.
6.	E994-95	Calibration and Testing Laboratory Accreditation Systems.

C. American Water Work Association (AWWA) Standard:

1.	D102-97	Coating Steel Water Storage Tanks.

D. Code of Federal Regulations (CFR):

1.	29 CFR 1926.62	Lead Standard, 2002.

E. Environmental Protection Agency (EPA) Document:

1.	SW-846	Proposed Sampling and Analytical Methodologies For Additions to Test Methods for Evaluating Solid Waste: Physical/ Chemical Methods, 1984.

F. National Association of Corrosion Engineers (NACE) Standard:

1.	No. 5-02	Surface Preparation of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating.

G. National Sanitation Foundation (NSF) Standard:

1.	61-02	Drinking Water System Components-Health Effects.

H. Steel Structures Painting Council (SSPC) Standards:

1.	CHAPTER 2.5-93	Water Blast Cleaning.
2.	CHAPTER 5.1-93	Paint Application.
3.	CHAPTER 6.0-93	Inspection.
4.	PA 2-96	Measurement of Dry Coating Paint Thickness with Magnetic Gages.
5.	SP 1-82	Solvent Cleaning.
6.	SP 2-82	Hand Tool Cleaning.
7.	SP 3-82	Power Tool Cleaning.
8.	SP 6-00	Commercial Blast Cleaning.
9.	SP 11-97	Power Tool Cleaning to Bare Metal.

I. U. S. Corps of Engineers (CoE) Manual:

1.	EM 385-1-1	Safety and Health Requirements Manual, 1996.

1.5. DELIVERY, STORAGE, AND HANDLING.

A. Packing and shipping. Deliver paint and paint-related materials in unbroken containers, sealed, and labeled by the manufacturer. This shall be done sufficiently in advance to allow 15 calendar days for testing.

B. Acceptance and testing. At the Government representative's direction, obtain a one-quart sample of each batch of paint by random selection from the unbroken, sealed containers. When samples are taken, thoroughly mix the contents of the sampled containers to render the sample truly representative. Draw the sample in the presence of the Government representative. In like manner, samples may be obtained from open containers from which paints are being used at the project work site. Clearly identify these samples by manufacturer's and contractor's name, specification number, generic name of material, batch number, project contract number, intended use, and quantity of material from which the sample was obtained.

C. Storage facilities.
1. Provide appropriate storage for paint and thinner in an area that is well ventilated and protected from sparks, flame, direct sunlight, or temperatures above 120°F. Keep paint susceptible to freeze damage in a heated storage space when necessary. Do not store flammable materials in any Government building.
2. Secure windows and provide one door with hasp and padlock, retaining the keys. The Government representative will require access to the storage area within 2 hours after request has been made to the contractor. Put paint materials in the storage building immediately upon delivery to the installation.
3. Obtain the Contracting Officer's approval with regard to safety and fire protection of contractor-provided storage facilities.

1.6 DEFINITIONS

A. The term "paint," as used herein, means all coating system materials, including primers, emulsions, acrylics, and other applied products whether used as a prime, intermediate, or top coat.

B. Standard coating terms defined in ASTM D16 apply to this Section.

C. Gloss ranges used in this Section include the following:
1. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at 60-degree meter.
2. High gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

D. Environments: The following terms are used to distinguish between different corrosive exposures:
   1. “Severe environments” are highly corrosive industrial atmospheres with sustained exposure to high humidity and condensation and with frequent cleaning using strong chemicals. Environments with heavy concentrations of strong chemical fumes and frequent splashing and spilling of harsh chemical products are severe environments.
   2. “Moderate environments” are corrosive industrial atmospheres with intermittent exposure to high humidity and condensation, occasional mold and mildew development, and regular cleaning with strong chemicals. Environments with exposure to heavy concentrations of chemical fumes and occasional splashing and spilling of chemical products are moderate environments.
   3. “Mild environments” are industrial atmospheres with normal exposure to moderate humidity and condensation, occasional mold and mildew developments, and infrequent cleaning with strong chemicals. Environments with low levels of mild chemical fumes and occasional splashing and spilling of chemical products are mild environments. Normal outdoor weathering is also considered a mild environment.

1.7 ORDER OF WORK

A. Where the work in a given area can be accomplished by a reduced labor force, request approval to begin work in a succeeding area. Do not begin work in a succeeding area until concurrence is received from the Government representative.

1.8 CONTINUED USE OF FACILITIES

A. During the accomplishment of work under this contract, surrounding facilities will continue to be occupied. Perform work in an orderly manner with minimum disturbance and inconvenience to the occupants. Confine and limit the activities of contractor personnel to only those areas required for performing daily work.

B. Obtain Work Clearances at each work area. Do not begin work until the Government representative signs the clearance. Follow procedure described in AEDC Safety Standard B1.

C. Schedule and regulate work performance to maintain the water tank in an acceptable condition for occupancy at all times. Inform the Government representative in advance of the proposed project work schedule to ensure timely access to the work area. The Government representative will inform the contractor when the water tank will be available for the performance of work. Perform contract work in a manner to minimize interference to other activities functioning in or near the work area.

D. Testing schedules determine when work in a given area can be accomplished. These schedules are subject to change with 12 hours minimum advance notice.

1.9 CLEAN-UP AND PROTECTION

A. Upon completion of the work, remove all spilled or splashed paint from surfaces which have been defaced. This requirement includes overspray.

B. Upon completion of the work, remove from the job site all painting equipment, scaffolding, surplus materials, and debris resulting from the work.

C. Keep trash and debris from collecting or being spread across the job site during the course of the job. Do not allow oil and solvent-soaked rags to accumulate. Remove them from the job site daily and transport to the AEDC construction landfill, located 2 miles west of the intersection of Avenue E and 6th Street.

1.10 EQUIPMENT

A. Painting equipment shall be comparable to that described in the paint manufacturer's most recent application instructions. Keep equipment clean and inspect daily. Use effective oil and water separators on all air lines. Maintain pressure at the gun and use starting tip sizes as recommended by the coating manufacturer.

B. Portable, hand-held power tools shall comply with the requirements listed in AEDC Safety Standard D8.

1.11 LABORATORY TESTING SERVICES

A. The contractor shall engage an independent testing laboratory to perform sampling and testing services. Forward the original copy of all laboratory reports and findings to the Contracting Officer.

B. The testing laboratory shall meet the basic requirements as specified in ASTM E994. Submit copies of report of inspection of laboratory facilities made by the Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection. Include a memorandum of remedies of any deficiencies reported by the inspection.

C. The laboratory shall provide qualified personnel to perform specified sampling and testing of materials and methods of testing to ensure compliance with EPA Standard SW-846 as specified in paragraph 1.2.E.

D. The laboratory shall promptly notify the contractor of irregularities or deficiencies of work which are observed during performance of services. Furnish the Contracting Officer an information copy of the notice.

E. The laboratory shall perform destructive tests of cleaned, primed, and painted surfaces within 2 weeks after the contractor has certified the specific building or structure has been completed in accordance with the specifications. Final finish coat shall have cured for at least 72 hours before being tested.
   1. Destructive tests shall require use of a Mark II or Mark III Tooke Gage. Take the sample in such a manner as to remove the contractor's applied coatings as well as the original undercoating where such a coating exists.
   2. Take four samples for each contract item, one from each vertical or major surface and from a location that is considered not easily accessible. The Government representative will select sample locations.
   3. Samples shall be tested to determine if the surface had been cleaned prior to painting, the number of coats applied, and the dry film thickness of each coat of paint applied by the contractor.

F. Reports of tests required by the approved detailed testing plan (see paragraph 1.2.E) and in paragraph 1.2.F shall include the following data:
   1. Date issued
   2. Project title and number
   3. Testing laboratory name and address
   4. Name and signature of inspector
   5. Date of inspection or sampling
   6. Record of temperature and weather
   7. Date of test
   8. Identification of product and specification section
   9. Location in project
   10. Type of inspection or test
   11. Observations regarding compliance with contract documents

G. The laboratory is not authorized to:
   1. Release, revoke, alter, or enlarge on requirements of contract documents
   2. Approve or accept any portion of work

1.12 CONTRACTOR'S TESTING PROCEDURE

A. As applicable to the type of tests to be performed, provide, and use the following instruments as specified in SSPC CHAP 6, to verify satisfactory compliance with the specifications prior to, during, and after the surface preparation and application of paint have been accomplished:
   1. Sling psychrometer.

2. Surface temperature gage.
3. Surface profile comparator.
4. Wet film thickness (WFT) gage.
5. Dry film thickness (DFT) gage (Conduct DFT tests as specified in SSPC PA 2.).
6. Mark II or III Tooke Gage.

1.13 PAINT APPLICATION

A. Use WFT gage to assure that the proper wet paint thickness is being applied to obtain the specified DFT. Refer to the paint manufacturer's product data sheet for the volume solids content and wet film information of the paint.

1.14 SIGNS

A. Prior to commencing painting, provide all signs, stands, and barricades necessary to post warnings along walkways, roadways, and parking areas adjacent to the work area.

B. Signs shall provide the following information: "NOTICE: PAINTING IN PROGRESS. PASS AT YOUR OWN RISK." Signs shall be furnished and maintained by the contractor.

C. Signs shall have a white background. The word "NOTICE" shall be 4-inch letters, blue on white; balance of words shall be 3-inch letters, black on white.

1.15 SAFETY

A. Comply with Corps of Engineers EM 385-1-1 and 29 CFR 1926.62 in the performance of all work.

B. Large portions of the work in this project are accomplished more than six feet above the ground and require safety rigging or other methods of access to provide safe working platforms for workers. The contractor shall perform all work in accordance with Government-approved rigging plan as referenced in paragraph 1.2.H of this section.

1.16 NOTICE PRIOR TO SPRAY PAINTING

A. Apply all paint by brush or roller unless a contractor request to spray is concurred with by the Government representative. If agreement is received from the Government representative, limit all spray painting to weekends, holidays, or after 4:00 p.m. on weekdays. In all cases, present the request to the Government representative 24 hours prior to the requested spray painting time. When spray painting, comply with AEDC Safety Standard F4.

B. Provide all signs, stands, and barricades necessary to post warnings along roads adjacent to the work area and at the entrances to all parking lots, through streets, and roads within a 500-foot perimeter around the work area. Signs shall be at least 2 by 2 feet and weighted for stability.

C. Signs shall provide the following information: “NOTICE: SPRAY PAINTING IN PROGRESS. PASS AT YOUR OWN RISK.“ Signs shall be maintained by the contractor.

D. Signs shall have a white background. The word “NOTICE“ shall be 4-inch letters, white on blue; balance of words shall be 3-inch letters, black on white.

PART 2 PRODUCTS

2.1 PAINT

A. As identified in Appendix I Paint Schedule. Materials specified are intended to establish standards of quality and generic types. All coatings shall be asbestos and heavy metal free, and VOC compliant.

1. Primer No. 1 — Water Tank Interior Metal Surfaces:
A high build, fast drying, polyamide epoxy certified by NSF to Standard 61 as a tank lining for potable water storage tanks. Sherwin-Williams Macropoxy 646 NSF fast cure epoxy B58 series or approved equal. Match with Coating A.

2. Primer No. 2 — Water Tank Exterior Metal Surfaces:
A rust inhibitive epoxy primer. A high performance, VOC compliant, heavy metal and asbestos free, high solids, two component, rust inhibitive, catalyzed polyamide epoxy steel primer. Sherwin Williams Epolon II, B67 series or approved equal. Match with Coating B.

3. Primer No. 3 — Water Tank Concrete Footings:
100% Acrylic emulsion conditioners. Sherwin Williams Loxon Conditioner, A24-100 or approved equal. Match with Coating C.

4. Coating A — Water Tank Interior Metal Surfaces:
A high build, fast drying, polyamide epoxy certified by NSF to Standard 61 as a tank lining for potable water storage tanks. Sherwin-Williams Macropoxy 646 NSF fast cure epoxy B58 series or approved equal. Match with Primer 1.

5. Coating B — Water Tank Exterior:
A hi-solids polyurethane, two-component, low VOC, aliphatic, acrylic polyurethane resin, maintenance coating. Sherwin Williams Hi-Solids Polyurethane B65 series, or approved equal. Match with Primer 2

6. Coating C — Water Tank Concrete Footings:
A heavy duty, 30% silicone alkyd protective topcoat for high-performance exterior industrial use. Sherwin Williams Steel Master 9500, 30% silicone alkyd, B56 series or approved equal. Match with Primer 3.

2.2 LABELS

A. Plainly showing the designated name of the material, formula or specification number, manufacturer's batch number, color, date of manufacture, manufacturer's directions (where applicable), and name of manufacturer, all of which shall be legible at time of use. Paints shall be furnished in containers not larger than five gallons. Batch production data shall include product composition and the following properties for which there are requirements in the material specifications: weight per gallon, viscosity, fineness of grind, drying time, color, gloss appearance of dried film, total solids (percent nonvolatile), and application properties.

2.3 THINNERS

A. If a thinner is necessary, use only the paint manufacturer's recommended thinner to thin the product and only in the amounts stated in the manufacturer's product data sheet.

2.4 ROLLER COVERS

A. Constructed of mohair, lambs' wool, or appropriate synthetic material and having the correct length naps as specified by the manufacturer to evenly and uniformly apply various products such as emulsions, enamels, cementitious coatings, and exterior oil base products over rough, smooth, striated, or textured surfaces.

2.5 BRUSHES

A. Full-bristled of natural or nylon bristles, of proper width with tapered tips. Do not use block brushes with coarse, stiff nylon bristles.

2.6 BLASTING AGGREGATE

A. As required in the surface preparation section of the paint schedule.

2.7 CLEANING SOLVENT

A. A slightly alkaline, low-foaming solvent used in conjunction with water-blast cleaning procedures.

2.8 RUST TREATMENT

A. A phosphoric acid, rust conversion solution for surface preparation of steel surfaces.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

A. Removal of lead-contaminated coatings with procedures specified in the paint schedule “surface preparation” column shall be accomplished by working the SSPC-designated procedure in conjunction with the AEDC-related procedure described in AEDC Standard E19.

Example: SSPC SP 11, Power Tool Clean to Bare Metal, will be worked in conjunction with AEDC No. 5, Scraping and Cleaning Using Power Tools with HEPA Vacuums and Associated Equipment. The SSPC procedure specifies the degree of cleanliness and the AEDC procedure details the lead- and heavy metal-abatement requirements.

B. Clean and inspect the surface of all steel and iron to ensure that all weld splatter, weld slag, grease, oil, and other foreign materials have been removed. Perform final surface preparation as specified in the SSPC standard identified in the paint schedule and in SSPC CHAP 5.1 and 6.0.

C. Apply primer coats to cleaned surface as soon as the cleaned surface has been inspected and cleared by the Government representative.

D. When requested by the Government representative, furnish on-site examples of surface preparation to be used as a standard for the job.

3.2 PREVIOUSLY PAINTED SURFACES

A. In preparing a previously painted surface, remove all corrosion and paint which show evidence of peeling, brittleness, blistering, checking, scaling, or general deterioration. Remove the old paint around the edges of the spot or area until an area of completely intact and adhering paint film, with no rust or

blisters underneath, is attained. Paint removed in the cleaning process may contain lead and shall be removed with the required power tools specified in paragraph 3.9. Drop cloths or 6-gage plastic sheets shall be placed under or around the item being cleaned to collect any paint particles not captured by the vacuum system of the power tools. All paint removed in the cleaning process shall be contained, collected, and deposited in containers specifically designed for hazardous waste. Store in a location designated by the Government representative in full compliance with requirements specified in Section 02085. Using HEPA-filtered vacuum equipment, remove existing visible paint chips from the ground or concrete prior to paint removal. The scope of this requirement extends a distance of 3 linear feet in all directions outside the area being prepared for painting.

B. If the old coating is sound, clean and prepare by surface preparation using procedures as specified in the paint schedule and follow by water blasting.

C. All previously painted surfaces contain lead and heavy metals. All removed materials shall be contained and packaged as required, depending on the hazardous material content of the waste. All employees exposed to these materials shall comply with Section 02085 for lead and heavy metals. Proper clothing, respirators, containment collection, packaging, and storage shall be followed. Store packaged materials in a location designated by the Government representative and in full compliance with Section 02085.

3.3 WATER BLASTING

A. When water blasting is specified to remove all rust, millscale, and foreign materials from previously unpainted structures to provide a sound surface to receive new coatings, prepare a test panel measuring 4 by 4 feet at each location as selected by the Government representative. This panel, when accepted by the Government representative, shall be the standard for the structure for which it was prepared.

B. Operating pressure shall be at the nozzle regardless of the elevation above or the distance from the water blast pumping equipment. All pressures for cleaning are specified in the paint schedule.

C. Spray emulsifier on surfaces at 50 pounds per square inch (psi) as specified in the paint schedule. Allow to stand for 10 to 15 minutes. Rinse with clear water at the blasting pressure specified in the paint schedule.

D. Should ungalvanized metal be exposed by this cleaning procedure, allow it to dry completely, then give it a protective primer coating specified in the paint schedule.

E. Use solvents, emulsions, cleaning compounds, and similar materials with steam, water, or water blasting methods to remove oil, grease, cutting compounds, organic materials, dirt, and other foreign matter from surfaces prior to painting. The appropriate methods are specified in the paint schedule. Rinse with clean water. Unless otherwise stipulated, use methods as specified in NACE No. 5 with AEDC No. 2 and SSPC CHAP 2.5. See paragraph 3.1.A for example.

3.4 ALUMINUM SURFACES

A. Solvent clean aluminum surfaces to be painted to remove oil and grease; then treat with specified primer coat. Painting to protect aluminum from contact with dissimilar materials is specified in the paint schedule.

3.5 BLAST CLEANING

A. Blast cleaning will only be permitted as specified in the paint schedule.

3.6 POWER TOOL CLEANING

A. When directed by the paint schedule to use power tool cleaning to bare metal (SSPC SP 11 with AEDC No. 5) on painted surfaces containing lead paint, the contractor shall use equipment designed and engineered to provide systems for the removal and recovery of hazardous materials. All recovery of hazardous materials shall comply with Section 02085.

3.7 COATING APPLICATION

A. Before any surface is coated, clean it carefully of all dust, grease, loose rust, millscale, and old paint. Notify the Government representative for inspection prior to painting.

B. Prepare all surfaces as specified in the paint schedule.

C. Do not apply coatings to wet or damp surfaces, except as specified in the manufacturer’s instructions.

D. Prime coat all cleaned metal immediately after cleaning and inspection to prevent new rusting or oxidation of cleaned surfaces.

E. Soak brushes used for emulsion paint in water for a period of 15 minutes prior to use.

3.8 MIXING AND BLENDING

A. Accomplish intermittent mixing as specified in the paint manufacturers' recommendations and only for amounts up to and including five gallons.

3.9 DECALS AND MARKINGS

A. Exercise care in protecting operating equipment so that the proper functioning of the equipment will not be affected.

B. Mask and otherwise protect name plates, switch plates, data tags, and gage dials to avoid painting over them. Remove protective materials at the completion of the job.

C. Replace decals, bands, blocks, tags, or pressure-sensitive markings which are removed, covered, damaged, or obliterated during work with similar or equal markers.

3.10 WORKMANSHIP

A. Clean all surfaces to comply with the paint schedule requirement.

B. Apply coatings to achieve the specified DFT, leaving a smooth, uniform film.

C. Ensure that application leaves no sags, brush marks, or discolorations.

D. Allow drying time between coats as specified in the coating manufacturer's recommendation with conditions of temperature and humidity taken into account.

E. Remove hardware, trim, and other items as required for proper application of paint.

F. Schedule cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

G. Ensure that painting conforms to the following general conditions:
   1. The DFT of each coat and of the entire system shall follow the requirements as specified in the paint schedule.
   2. Except where otherwise specified, thin only if necessary for the workability of the coating material, and then only as specified in the coating manufacturer's most recently printed data sheet.
   3. Tint intermediate coating sufficiently darker than the top coat to be able to differentiate between the two coats.

H. Furnish all stenciling equipment and materials to replace exactly the existing marking size, shape, location, wording, and numbers. Record locations of existing markings on drawings or diagrams prior to commencing work. Give copies of the drawings and diagrams to the Government representative.

I. Mask and otherwise protect name plates, switch plates, data tags, and gage dials to avoid painting over them. Remove protective materials at the completion of the job.

3.11 PAINT SCHEDULE (APPENDIX I)

A. Ensure that the surfaces listed in the paint schedule receive the surface preparation, type of paint, number of coats, and film thickness identified.

B. Use colors for individual items as specified in the paint schedule. Do not substitute colors without written approval of the Contracting Officer.

C. Limited access due to Government operations or existing hazards is indicated by Δ at the top of each applicable item in the paint schedule, “Surface Preparation“ column.

D. Where lead and heavy metals in paint have been identified on the existing painted surfaces, these surfaces will be indicated with the symbol ☒. This symbol will appear in the “Surface Preparation“ column of the paint schedule besides each item description that contains these materials. Removal of paint from surfaces flagged with this symbol shall be accomplished by following SSPC SP 11 with AEDC No. 5. The power tools used in this procedure shall be equipped with the type vacuum and filtration system required in Section 02085 and paragraph 3.9 of this section.

END OF SECTION

SECTION 16641
INTERNAL SYSTEM - CATHODIC PROTECTION

PART 1 GENERAL

1.1 DESCRIPTION

A. This section covers the requirements for designing, furnishing, installing, and testing a complete impressed current cathodic protection system for the internal surfaces of the elevated water tank No. 351.

B. It is the intent of this technical specification that the contractor engages the services of a Cathodic Protection Specialist certified by NACE International to direct the installation of the cathodic protection system. The specialist shall be on site during installation and must conduct all testing.

1.2 SCOPE

A. The contractor shall furnish a design, all labor, equipment and materials to provide a cathodic protection system to protect the internal submerged surfaces of the elevated water tank. This shall include, but not necessarily be limited to, furnishing and installing all anodes, reference cells, conduit, boxes, wire, rectifier, and incidental items.

B. Provide a cathodic protection system in accordance with AWWA D104.

C. The contractor shall engage the services of a Cathodic Protection Specialist, certified by NACE International, subject to approval by the Government representative; to supervise the installation of and test the specified cathodic protection system as specified.

D. The contractor shall be responsible for the installation and certification of all the cathodic protection work performed under this Contract.

E. The specialist shall be on site when any cathodic protection work occurs.

1.3 CODES AND STANDARDS: The work shall be performed in accordance with the latest requirements of laws and codes governing this work, including but not limited to:

A. National, State, and Local Laws, Regulations and Codes.

B. America Water Works Association (AWWA) Standard:
1. D104-01 Automatically Controlled, Impress-Current Cathodic Protection for the Interior of Steel Water Tanks.

C. Code of Federal Regualation (CFR) Standards:
   1. 49 CFR 180 Continuing qualification and Maintenance of Packagings.
   2. 49 CFR 195 Transportation of Hazardous Liquids by Pipeline.

D. International Electrical and Electronics Engineers (IEEE) Standard:
   1. C2-02 National Electrical Safety Code.

E. NACE International Standard:
   1. RP0169 Control of External Corrosion on Underground or Submerged Metallic Piping Systems.

F. National Fire Protection Association (NFPA) Standard:
   1. 70-02 National Electrical Code (NEC).

G. Tennessee Department of Environmental Conservation (TDEC) Standard:

1.4 INSTALLER QUALIFICATIONS:

A. The cathodic protection installer shall be a firm regularly involved in corrosion control work on a full-time basis for a period of at least 4 years.

B. Installer:
   1. Corrosion Control Inc.
   2. Approved equal.

C. That portion of the work, which involves the installation of the cathodic protection system and the testing thereof, shall be performed under the direct field supervision of the certified cathodic protection specialist.

D. The cathodic protection specialist shall have extensive experience in the design and testing of elevated water storage tank cathodic protection systems.

E. A certified corrosion technician shall assist the specialist in the installation and testing of the cathodic protection system.

1.5 REQUIRED SUBMITTALS:

A. Document requirements: All submittal documents for this specification section shall be issued in a complete package. Partial submittals will not be accepted.

B. Corrosion engineer: A résume and project listing of individual certified by NACE as a cathodic protection specialist. The experience shall include at least 15 years of field experience with a listing of at least 5 projects on water tanks. The corrosion engineer shall sign off on the submittal documents. A signature page shall be included in the submittal.

C. Corrosion technician: Résume and experience of technician.

D. Design documents: Design manual with the following information:
   1. Design narrative describing cathodic protection system and compliance with the specification.
   2. Design calculations showing surface area, current density, current required, anode resistance to water, rectifier rating, and anode life.
   3. Full size (28 inches by 40 inches) drawings, with layout and section view to scale. Include details showing conduits, rectifier, cells anodes, and test box.
   4. Material list with quantities, description, manufacture and model number.
   5. Product data sheets for each component.

E. During and after the installation, the cathodic protection system shall be inspected and tested by the certified specialist. Tests shall be conducted to ensure that all components are properly installed and ready for operation. Any deficiencies in components or the performance of the system revealed by the testing shall be corrected and retested until the system is performing as required herein. At the completion of the testing, the contractor shall provide a report issued by the cathodic protection specialist certifying that the system is capable of performing to the full extent of the requirements of these Specifications. The specialist shall test all of the cathodic protection components. This includes verification that components are installed properly and fully operable.

F. The contractor shall submit to the Government representative 6 certified copies of the final report, including all data and analysis provided by the corrosion specialist and "As-Built" drawings of the installation. Such submittals shall show the accurate location, type, weight, and spacing of each anode, potentials, settings, and rectifier output levels.

1.6 DESIGN PARAMETERS

Coating Efficiency	75%
Current Density	2 mA/ft^2
Water Resistivity	2100 ohm•cm
Minimum Life	30 years
Riser Diameter	48 inches
Riser height	103 feet
Bowl Diameter	48 feet
Bowl Height	26 feet
Minimum Number Bowl Anodes	6 each

1.7 WARRANTIES/GUARANTEES

A. Provide a warranty/guarantee to include the following:
   1. All points tested will exceed -850 mV “instant off”, without exceeding -1100 mV “instant off”.
   2. The anodes must carry a 7-year warranty.
   3. The design must be issued in accordance with this specification and the codes/practices of NEC, NFPA, AWWA and NACE.

PART 2 MATERIALS

2.1 GENERAL

A. All materials shall be of the latest design, in new condition and of first quality standard product of manufacturers regularly engaged in the production of such materials. All materials shall be compatible.

2.2 REFERENCE CELLS

A. The reference electrodes shall be of the permanent type, and shall be copper/copper sulfate, Model CS-CU-2, as manufactured by APS or approved equal.

B. Reference electrodes shall have a design life of 20 years and an accuracy of ±5 MV. Cell shall be housed in a ceramic tube.

C. The lead wire shall be at least 100 feet long; No. 14 AWG stranded copper wire with RHS-USE insulation, yellow in color.

D. One cell shall be in the bowl near the floor, and the second halfway down the riser.

2.3 TEST BOX

A. NEMA 4X fiberglass, 10 inches by 12 inches, phenolic faceplate, 0.01 ohm shunts for bowl and riser anode circuits, 2 ohm slide resistor for riser circuit, 2 isolated cells and 1 isolated tank test lugs.

B. Provide Myers hubs at entrances, and electrical seal off in conduit from tank.

C. An inhibitive sponge shall be provided within the box.

2.4 CABLES

A. Anode: #10 HMWPE (black)

B. Collector: #10 RHW-USE (black)

C. Cell: #14 RHW-USE (yellow)

D. In conduit:
   1. Cell: #14 THHN (yellow) (2)
   2. Tank: #14 THHN (white)
   3. Negative: #10 THHN (white)
   4. Riser anode: #10 THHN (black)
   5. Bowl anode: #10 THHN (red)

2.5 RECTIFIER UNIT – UNIVERSAL RECTIFIER OR APPROVED EQUAL

A. 115 VAC, single phase input, 3 coarse and 6 fine tap settings, hi-low switch.

B. Hot dipped galvanized enclosure, air cooled, wall mounted, side doors independent, heavy gauge steel. No painted or plastic enclosures.

C. Surge protection on input and output circuits.

D. Efficiency filter.

E. Individual ammeter and voltmeter displays.

F. Rated at 20 volts – 5 amperes minimum.

2.6 IMPRESSED CURRENT ANODE – APS OR APPROVED EQUAL

A. 0.062 inch mixed metal oxide coated, copper core titanium, factory splices, with weight on end.

B. #10 AWG stranded copper with HMWPE insulation, continuous length, spliced top and bottom of each anode string, maximum splice distance 50 feet.

C. Seven-year warranty on anodes.

D. Wire rating: 100 mA/ft.

2.7 CONDUIT

A. 3/4-inch GRS with galvanized supports.

2.8 HAND HOLE ASSEMBLIES

A. Hand holes shall be drilled 4 inches minimum.

B. Gasket shall be full size red rubber.

C. Hand hole cover shall be non-metallic, extending 1 inch over edge of hole.

D. Keeper bar shall be 1-inch wide by 1/4-inch thick stainless steel, with stainless steel bolt.

E. Cable hangers shall be 3/8-inch insulated stainless steel eyebolts.

F. Provide an access hole for each bowl anode, minimum of 6, and center riser.

PART 3 EXECUTION

3.1 ANODE & REFERENCE CELLS

A. Drill access hand holes and eyebolt holes prior to painting.

B. Remove existing anodes, cells, conduits, and rectifier. Remove this material from the base.

C. After painting, install cable hangers.

D. Lower bowl anodes into place, at least 3 feet off floor.

E. Lower riser anode and spacers into riser pipe, secure to hanger. Lower riser cell into pipe and secure to hanger. Attach cell to spacer to ensure it is close to steel surface.

F. Lower bowl cell in place, near manhole, 6 inches above tank floor. Secure cable to hanger.

G. Splice bowl anode leads to collector cable using YC10C10 crimps and rubber tape. Coat splices with 3M Scotch Kote or approved equal.

H. Route riser anode, cell, and collector cables to entrance fitting near manhole.

3.2 CONDUIT

A. Mount 3/4-inch GRS conduit on ladder rungs, using galvanized hangers.

B. At platform and at entrance, use flexible liquid seal conduit.

C. Use flexible liquid seal conduit at base of tank to enter test box and rectifier.

D. Use Myers hubs on test box and seal conduits.

3.3 CABLES

A. Pull anode, reference cell, and negative cables from top of tank into test box.

B. Connect negative and test cables to tank roof and coat connection.

3.4 RECTIFIER UNIT AND TEST BOX

A. Mount rectifier cabinet on existing bracket on tank leg.

B. Mount test box below rectifier unit.

C. Terminate DC conduits and cables.

D. Route existing 115 VAC power into rectifier.

E. Place inhibitive sponge in test box.

3.5 ENERGIZING AND TESTING:

A. The contractor shall notify the Government representative at least 2 weeks in advance of all cathodic protection field tests to permit arrangements for the presence of the Government representatives to witness such tests.

B. After installation of the cathodic protection system, the entire system shall be inspected and tested by the cathodic protection specialist, with the assistance of the technician, in accordance with recommended procedures of NACE International, to assure its proper operation. First the specialist shall inspect the components to ensure they were properly installed. Then the specialist shall obtain “native” potentials on both permanent cells. Record potentials using a MC Miller Model LC-4 voltmeter. The specialist shall ensure that all cables are properly terminated and that all cables and boards are tagged. Leave all cables connected. The specialist shall also obtain native potentials on 50 foot centers down the riser, on 5-foot center behind the internal ladder at the manway, and at the bottom of the bowl at each bowl anode access hole. The specialist shall then energize the rectifier unit, ensuring it is operable. The specialist shall adjust the rectifier unit to obtain a desirable potential. The system shall then be allowed to operate overnight. The specialist shall then retest the system. Obtain “On” and “Instant Off” potentials on each cell, and with the portable cell in the tank, using an interruption cycle of 30 seconds “On” and 2 seconds “Off”. The criteria to be used are -850 mV “instant off”. The “Instant Off” readings to be recorded are those which are the lowest observed during the interruption cycle. If areas do not meet criteria, the rectifier shall be adjusted and allowed to polarize prior to retest. None of the “Instant Off” potentials shall exceed –1100 millivolts. Final rectifier and

outputs shall be recorded. All testing shall be witnessed by the Government representative.

C. Upon completion of final inspection, the specialist shall submit 6 copies of the compliance report to the Government representative. This report shall be comprehensive and shall include field data, analysis of the data, and As-Built drawings.

D. The Government reserves the right to have the cathodic protection system tested by a third party after the contractor submits their report. Any deficiencies found during this inspection shall be corrected by the contractor at no cost to the Government.

END OF SECTION

APPENDIX I

PAINT SCHEDULE

SURFACE PREPARATION
SYSTEM DESIGNATIONS AND DESCRIPTIONS

NACE NO. 5-95: WATER BLAST. APPLY EMULSIFIER AND WATER AT 50 PSI; RINSE WITH CLEAR WATER AT 5,000 PSI. REMOVE LOOSE PAINT OF FAILED PAINT SYSTEMS TO SOUND SUBSTRATE OR BARE METAL. REMOVE ALL GREASE, OIL, DIRT, AND RUST. PROVIDE A CLEAN, SOUND SUBSTRATE. USE WITH AEDC PROCEDURE NO. 2 (E 19).

SSPC SP 1: HAND CLEAN WITH SOLVENTS AND CLEAN CLOTHS. REMOVE OIL, GREASE, DIRT, CHALKING PAINT, OXIDES, AND FOREIGN MATERIALS. PROVIDE A CLEAN, SOUND SUBSTRATE. WORK WITH AEDC PROCEDURE NO. 3.

SSPC SP 2: HAND TOOL CLEAN. REMOVE LOOSE RUST AND DIRT. SURFACE SHALL BE CLEAN AND SOUND BEFORE PAINTING. WORK WITH AEDC PROCEDURE NO. 1.

SSPC SP 3: POWER TOOL CLEAN WITH ELECTRICAL OR PNEUMATIC TOOLS. REMOVE LOOSE PAINT, RUST, DIRT, AND FOREIGN MATERIALS. SAND EDGES TO PROVIDE A CLEAN, SOUND, UNIFORM SURFACE. WORK WITH AEDC PROCEDURE NO. 3.

SSPC SP 5: WHITE METAL BLAST ALL INTERIOR SURFACES TO BARE WHITE METAL. SIZE BLAST AGGREGATE TO PROVIDE A 1.5-2.0 MIL PROFILE PATTERN. FIRST COAT OF PAINT MUST BE APPLIED BEFORE FLASH RUSTING OCCURS. USE WITH AEDC PROCEDURE NO. 6 (E 19).

SSPC SP 6: COMMERCIAL BLAST TO BARE METAL WITH STEEL GRIT BLASTING AGGREGATE. USE MATERIAL THAT IS FREE OF HEAVY METALS, SILICA SAND, DUST, DIRT, AND FOREIGN MATERIALS THAT WILL CONTAMINATE THE BLASTED AREA. GRADE MATERIAL TO PROVIDE A SURFACE PROFILE PATTERN OF 1.0 TO 1.5 MILS. USE THIS SYSTEM IN COORDINATION WITH AEDC PROCEDURE NO. 6.

SSPC SP 11: POWER TOOL CLEAN TO BARE METAL WITH PNEUMATIC TOOLS. REMOVE ALL VISIBLE DIRT, DUST, PAINT, OXIDE, CORROSION PRODUCT, AND OTHER FOREIGN MATERIALS. TOOLS SHALL BE EQUIPPED WITH VACUUMS AND FILTER SYSTEMS COMPLYING WITH OSHA AND EPA HAZARDOUS MATERIALS PROCESSING STANDARDS. WORK WITH AEDC PROCEDURE NO. 5.

CLEANING SOLVENT: HIGH-PRESSURE WATER-BLAST CLEANING SOLVENT. SLIGHTLY ALKALINE, LOW FOAMING. APPLY ACCORDING TO MANUFACTURER'S RECOMMENDED PRACTICES. COMPLY WITH ASTM D1172

CAULKING: REMOVE OLD, DRY, CRACKED, LOOSE CAULKING. REPLACE WITH ACRYLIC LATEX, ACRYLIC CAULKING. COMPLY WITH ASTM C834-95. MATERIALS SHALL BE HEAVY-METAL AND ASBESTOS FREE.

PAINT SCHEDULE
PRIMER COATINGS
SYSTEM DESIGNATIONS AND DESCRIPTIONS

PRIMER NO. 1: **FOR WATER TANK INTERIOR METAL SURFACES**.
STRIPE COAT AND PRIMER. MATCH WITH FINISH COAT A.

PRIMER COAT: **PERFORMANCE CRITERIA**

GENERAL DESCRIPTION: MACROPOXY 646 NSF FAST CURE EXPOXY IS A HIGH BUILD, FAST DRYING, POLYAMIDE EPOXY CERTIFIED BY NSF TO STANDARD 61 AS A TANK LIING FOR POTABLE WATER STOREAGE TANKS. SHERWIN-WILLIAMS MACROPOXY 646 NSF FAST CURE EPOXY B58 SERIES OR APPROVED EQUAL.

COLOR: MILL WHITE
FINISH: SEMI-GLOSS

VOLUME SOLIDS: 72% ± 2.0% MIXED. APPLY MATERIAL AT A RATE RECOMMENDED BY THE MANUFACTURER TO PROVIDE A 5.0 TO 8.0-MIL DRY FILM THICKNESS (DFT).

VOLATILE ORGANIC COMPOUNDS (VOC) (EPA METHOD 24): UNREDUCED: 235 GRAMS/LITER; 1.96 POUNDS/GALLON
REDUCED 10%: 290 GRAMS/LITER; 2.4 POUNDS/GALLON

DRY HEAT RESISTANCE: METHOD: ASTM D2485
RESULT: 250°F

THIS PRODUCT SHALL MEET OR EXCEED THE FOLLOWING TEST REQUIREMENTS:

ABRASION: METHOD: ASTM D4060, USING THE CS-17 WHEEL. AFTER 1,000 CYCLES, 1 KG LOAD. RESULT: 84MG LOSS.

ADHESION: METHOD: ASTM D4541. RESULT: 1,037 PSI.

IMMERSION: METHOD: 1 YEAR FRESH AND SALT WATER
RESULT: PASSES, NO RUSTING, BLISTERING, OR LOSS OF ADHESION.

PAINT SCHEDULE
PRIMER COATINGS
SYSTEM DESIGNATIONS AND DESCRIPTIONS

PRIMER NO. 2: **FOR WATER TANK EXTERIOR METAL SURFACES.**
MATCH WITH FINISH COAT B.

PRIMER COAT: **PERFORMANCE CRITERIA**

GENERAL DESCRIPTION: RUST INHIBITIVE EPOXY PRIMER. A HIGH PERFORMANCE, VOC COMPLIANT, HEAVY METAL AND ASBESTOS FREE, HIGH SOLIDS, TWO COMPONENT, RUST INHIBITIVE, CATALYZED POLYAMIDE EPOXY STEEL PRIMER. SHERWIN WILLIAMS EPOLON II B67 SERIES OR APPROVED EQUAL.

COLOR: OFF WHITE
FINISH: LOW SHEEN

VOLUME SOLIDS: 67% ± 2.0%. ASTM D2697 MIXED. APPLY MATERIAL AT A RATE RECOMMENDED BY THE MANUFACTURER TO PROVIDE A 4.0-MILS DRY FILM THICKNESS (DFT). NOTE: BRUSH/ROLLER APPLICATION MAY REQUIRE MULTIPLE COATS TO ACHIEVE MAXIMUM FILM THICKNESS AND UNIFORMITY OF APPEARANCE.

VOLATILE ORGANIC COMPOUNDS (VOC): (EPA METHOD 24): UNREDUCED: 282 GRAMS/LITER; 2.35 POUNDS/GALLON.
REDUCED 6%: 324 GRAMS/LITER; 270 POUNDS/GALLON.

DRY HEAT RESISTANCE: METHOD: ASTM D2485. RESULT: 250°F; INTERMITTENT 275°F.

THIS PRODUCT SHALL MEET OR EXCEED THE FOLLOWING TEST REQUIREMENTS:

ADHESION: METHOD: ASTM D4541. THE TEST SPECIMEN SHALL ADHERE AGAINST A 715-PSI PULL.

SALT FOG: METHOD: ASTM B117. SPECIMEN SHALL BE EXPOSED FOR 2,000 HOURS. RESULT: RATING 10 PER ASTM D610, NO DISBONDING, NO PIN POINT RUSTING. NO MORE THAN 1/16 INCH RUST CREEPAGE AT SCRIBE.

PAINT SCHEDULE
PRIMER COATINGS
SYSTEM DESIGNATIONS AND DESCRIPTIONS

PRIMER NO. 3:	**FOR WATER TANK CONCRETE FOOTINGS**
PRIMER COAT:	**PERFORMANCE CRITERIA**
GENERAL DESCRIPTION:	100% ACRYLIC EMULSION CONDITIONERS. PRODUCT SHALL BE HEAVY METAL AND ASBESTOS-FREE AND VOC-COMPLIANT. REMOVE MILDEW PRIOR TO PAINTING, RINSE THOROUGHLY WITH WATER AND ALLOW SURFACE TO DRY BEFORE PAINTING. NEW OR EXISTING CONCRETE AND MORTAR MUST CURE WITH pH FROM 6 – 13. SHERWIN WILLIAMS LOXON CONDITIONER A24-100 OR APPROVED EQUAL.
COLOR:	GUIDE COAT WHITE. DO NOT TINT.
FINISH:	FLAT.
VOLUME SOLIDS:	19% ± 2.0%. APPLY AT RATE RECOMMENDED BY THE MANUFACTURER.
VOLATILE ORGANIC COMPOUNDS (VOC) LIMIT:	MAXIMUM: 106 GRAMS/LITER OR 0.88 POUNDS/GALLON
TEMPERATURE RESISTANCE:	DO NOT APPLY AT TEMPERATURES BELOW 50°F.

PAINT SCHEDULE
FINISH COATINGS
SYSTEM DESIGNATIONS AND DESCRIPTIONS

FINISH COAT A:	**FOR WATER TANK INTERIOR.** FINISH COAT. MATCH WITH PRIMER NO. 1.
PRIMER COAT:	**PERFORMANCE CRITERIA**
GENERAL DESCRIPTION:	A HIGH BUILD, FAST DRYING, POLYAMIDE EPOXY CERTIFIED BY NSF TO STANDARD 61 AS A TANK LIING FOR POTABLE WATER STOREAGE TANKS. SHERWIN-WILLIAMS MACROPOXY 646 NSF FAST CURE EPOXY B58 SERIES OR APPROVED EQUAL.
COLOR PRIMER:	LT BLUE
FINISH COAT:	MILL WHITE
FINISH:	SEMI-GLOSS
VOLUME SOLIDS:	72% ± 2.0% MIXED. APPLY MATERIAL AT A RATE RECOMMENDED BY THE MANUFACTURER TO PROVIDE A 5.0 TO 8.0-MIL DRY FILM THICKNESS (DFT).
VOLATILE ORGANIC COMPOUNDS (VOC) (EPA METHOD 24):	UNREDUCED: 235 GRAMS/LITER; 1.96 POUNDS/GALLON REDUCED 10%: 290 GRAMS/LITER; 2.4 POUNDS/GALLON
DRY HEAT RESISTANCE:	METHOD: ASTM D2485 RESULT: 250°F

THIS PRODUCT SHALL MEET OR EXCEED THE FOLLOWING TEST REQUIREMENTS:

ABRASION:	METHOD: ASTM D4060, USING THE CS-17 WHEEL. AFTER 1,000 CYCLES, 1 KG LOAD. RESULT: 84MG LOSS.
ADHESION:	METHOD: ASTM D4541. RESULT: 1,037 PSI.

PAINT SCHEDULE
FINISH COATINGS
SYSTEM DESIGNATIONS AND DESCRIPTIONS

FINISH COAT B:	**FOR WATER TANK EXTERIOR.** INTERMEDIATE, AND TOP COATS. MATCH WITH PRIMER 2.
FINISH COAT:	**PERFORMANCE CRITERIA**
GENERAL DESCRIPTION:	HI-SOLIDS POLYURETHANE, TWO-COMPONENT, LOW VOC, ALIPHATIC, ACRYLIC POLYURETHANE RESIN, INDUSTRIAL MAINTENANCE COATING. PRODUCT SHALL BE HEAVY METAL AND ASBESTOS FREE AND VOC-COMPLIANT. SHERWIN-WILLIAMS HI-SOLIDS POLYURETHANE B65 SERIES, OR APPROVED EQUAL.
FINISH:	HIGH-GLOSS
COLOR:	WATER TANK WHITE
VOLUME SOLIDS:	65% ± 2.0%. APPLY MATERIAL AT A RATE RECOMMENDED BY THE MANUFACTURER TO PROVIDE A 3.0-4.0 MIL DRY FILM THICKNESS (DFT).
VOLATILE ORGANIC COMPOUNDS (VOC): (EPA METHOD 24)	UNREDUCED: 289 GRAMS/LITER; 2.40 POUNDS/GALLON. REDUCED 15%: 369 GRAMS/LITER; 3.08 POUNDS/GALLON.
DRY HEAT RESISTANCE:	METHOD: ASTM D2485. RESULT -- 200°F

THIS PRODUCT SHALL MEET OR EXCEED THE FOLLOWING TEST REQUIREMENTS:

ABRASION:	METHOD: ASTM D4060, USING THE CS-17 WHEEL. 1 KG LOAD. RESULTS: 87.1 MG LOSS.
ADHESION:	METHOD: ASTM D4541. RESULT: 1050 PSI
MOISTURE CONDENSATION RESISTENCE:	METHOD: ASTM 4585, 100ºF, 1000 HOURS. RESULTS: NO RUSTING, BLISTERING, OR DELAMINATION.

PAINT SCHEDULE
FINISH COATINGS
SYSTEM DESIGNATIONS AND DESCRIPTIONS

FINISH COAT C: **FOR WATER TANK CONCRETE FOOTINGS.**
INTERMEDIATE, AND TOP COATS. MATCH WITH PRIMER 3

INTERMEDIATE AND TOP COAT: **PERFORMANCE CRITERIA**

GENERAL DESCRIPTION: A HEAVY DUTY, 30% SILICONE ALKYD PROTECTIVE TOPCOAT FOR HIGH-PERFORMANCE EXTERIOR INDUSTRIAL USE. PRODUCT SHALL BE HEAVY METAL AND ASBESTOS-FREE AND VOC-COMPLIANT. SHERWIN-WILLIAMS STEEL MASTER 9500, 30% SILICONE ALKYD, B56 SERIES, OR APPROVED EQUAL.

COLOR: LT GRAY
FINISH: HIGH GLOSS.

VOLUME SOLIDS: 62.0% ± 2.0% (MIXED). APPLY MATERIAL AT A RATE RECOMMENDED BY THE MANUFACTURER TO PROVIDE A 2.0 - 3.0-MIL DRY FILM THICKNESS (DFT).

VOLATILE ORGANIC COMPOUNDS (VOC) LIMIT: MAXIMUM: 310 GRAMS/LITER OR 2.59 POUNDS/GALLON

TEMPERATURE RESISTANCE: DRY CONTINUOUS -- 200°F

THIS PRODUCT SHALL MEET OR EXCEED THE FOLLOWING TEST REQUIREMENTS:

EXTERIOR DURABILITY: METHOD: 1 YEAR AT 45 DEGREE SOUTH.
RESULT: EXCELLENT.

ADHESION: METHOD: ASTM D3359 METHOD B.
RESULT: 5B, 100% RETENTION.

SALT SPRAY: METHOD: ASTM B117. SPECIMEN SHALL BE EXPOSED FOR 1,000 HOURS.

PAINT SCHEDULE
SURFACE PREPARATION
SYSTEM DESIGNATIONS AND DESCRIPTIONS

PAINT SCHEDULE
SURFACE PREPARATION
SYSTEM DESIGNATIONS AND DESCRIPTIONS

1. WATER TANK INTERIOR
   B58 WX 610
   MILL WHITE

2. WATER TANK EXTERIOR
   B65 W 351
   WATER TANK WHITE

3. WATER TANK FOOTINGS
   SW4030
   NICHEL

4. WATER TANK LADDERS
   B65 Y 337
   SAFETY YELLOW

NOTE: SHERWIN-WILLIAMS INDUSTRIAL COATINGS COLOR REFERENCE DESIGNATIONS OR EQUAL.

PAINT SCHEDULE (DESCRIPTION, LOCATION AND APPLICATION)

CODE ○ HIGH STRUCTURE Δ LIMITED ACCESS ☒ LEAD PAINT + ASBESTOS

ITEM NO.	DESCRIPTION AND LOCATION	DWG NO.	SURFACE PREPARATION	PRIMER	INTERMEDIATE COAT	TOP COAT
1 PAGE 1	250,000 GALLON ELEVATED POTABLE WATER TANK BUILDING NO. 351. INTERIOR PREVIOUSLY PAINTED STEEL: A. TANK B. RING C. RISER D. RISER LADDER E. INTERIOR LADDER		☒ SSPC SP 5 AEDC NO. 6 NACE NO. 5-95 AEDC NO. 2 WATER BLAST - 5,000 PSI	FULL COAT METAL: PRIMER NO. 1 HOLIDAY TEST AFTER EACH COAT	FULL COAT: COATING A	FULL COAT: COATING A DFT TOTAL 21-24.0 MILS COLOR NO. 1
2	EXTERIOR PREVIOUSLY PAINTED STEEL: B. WATER TANK C. WATER TANK STRUCTURE AND TANK UNDER-CARRIAGE D. HANDRAILS E. PERIMETER WALK F. ALL ATTACHMENTS, SUPPORTS		☒ SSPC-SP 6 AEDC NO. 6 NACE NO. 5-95 AEDC NO. 2 WATER BLAST 5,000 PSI	FULL COAT METAL: PRIMER NO. 2 HOLIDAY TEST AFTER EACH COAT	FULL COAT: COATING B	FULL COAT: COATING B DFT 12.0 MILS TOTAL COLOR NO. 2
3	CONCRETE BASE PREVIOUSLY PAINTED AND NEW CONCRETE REPAIRS: A. CONCRETE FOOTINGS A. RISER CONCRETE BASE.		SSPC-SP 6 AEDC NO. 6 NACE NO. 5-95 AEDC NO. 2 WATER BLAST AT 3,000 PSI	FULL COAT PRIMER NO. 3 HOLIDAY TEST AFTER EACH COAT	FULL COAT: COATING C	FULL COAT: COATING C TOTAL DFT 8.0 MILS COLOR NO. 3

END OF ITEM NO. 1